

# Machine and Tool **BLUE BOOK**

A DIGEST OF THE METAL WORKING INDUSTRY

**MARCH 1949**

**THIS MONTH**

Inspecting Airfoil Contours of Blades

Flame Spinning, a Metal Forming  
Method

Manufacturing Oil Well Equipment

Effect of Quantity on Machine Selection

Selling Tools

What's New in Metalworking

Available Literature

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Index to Advertisers

**COMPLETE INDEX ON PAGE 5**

**A HITCHCOCK PUBLICATION**

# "MARVEL"...

## *Has The EDGE*

MARVEL HIGH-SPEED-EDGE PATENTED  
ARMSTRONG-BLUM MFG. CO.  
CHICAGO 39, ILL. MADE IN U.S.A.

MARVEL High-Speed-Edge Blades assure Faster, more Accurate cutting with proven Economy and complete Safety. Only the MARVEL is a composite blade with a high speed steel cutting edge electrically welded to an exceptionally tough, strong steel body.

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cutting edge.

Tough unbreak-  
able alloy steel  
body with hard-  
ened eyes.

Integrally  
welded to make  
a fast-cutting,  
long lasting  
composite blade  
that is posi-  
tively unbreak-  
able.

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"The Hack Saw People"

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**SAWS**  
Better Machines - Better Blades

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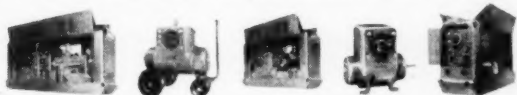
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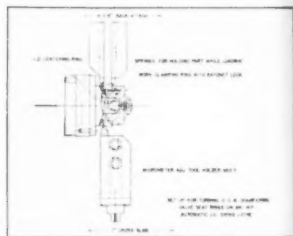
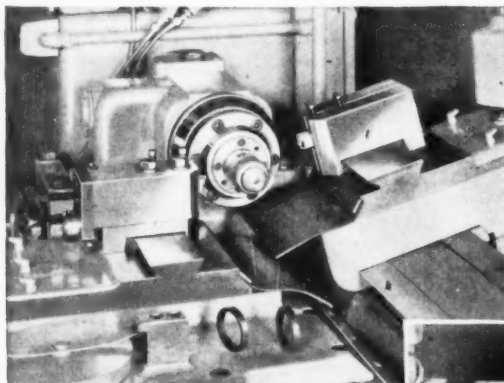
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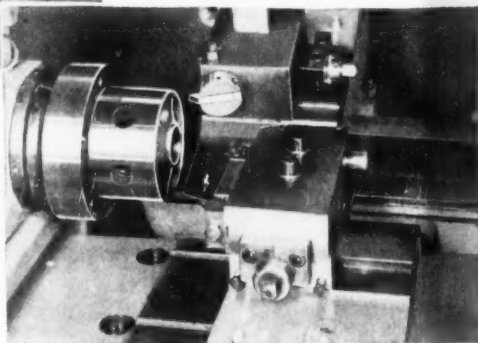
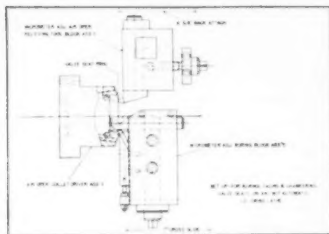
# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



◀ First operation machine (left) and tooling (above)

Second operation machine (right) and tooling (below)



## Lo-swing IMPs TURN, BORE, FACE AND CHAMFER VALVE SEATS WITH SPEED AND ACCURACY

**Problem:** To provide automatic cycle machines for two operations on Valve Seats machined from very hard material. Specifications call for fine finish and accuracy, and ability to change over from one size valve seat to another.

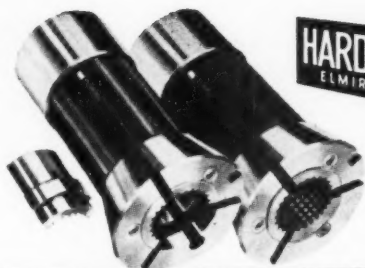
**Solution:** The IMP Automatic Lo-swing Lathes selected for this job were equipped with tooling clearly shown in the illustrations and line drawings. The parts are delivered to the first operation machines, rough ground on their two parallel faces. The parts are mounted on an air operated arbor, equipped with a bayonet lock for quick action, and clamped on the ground faces. The automatic

cycle is then started and the part is turned and chamfered on the O. D. The second operation machines, are fitted with an air operated collet chuck which clamps the part true with the O. D. The automatic cycle is started and tools on the front carriage bore and chamfer the I. D., while a tool mounted in a relieving type tool block on the back attachment finishes the face true with the O. D. and the bore. One operator runs two machines, each of which have the same cycle time.

Consult our Engineering Department on your turning problems.

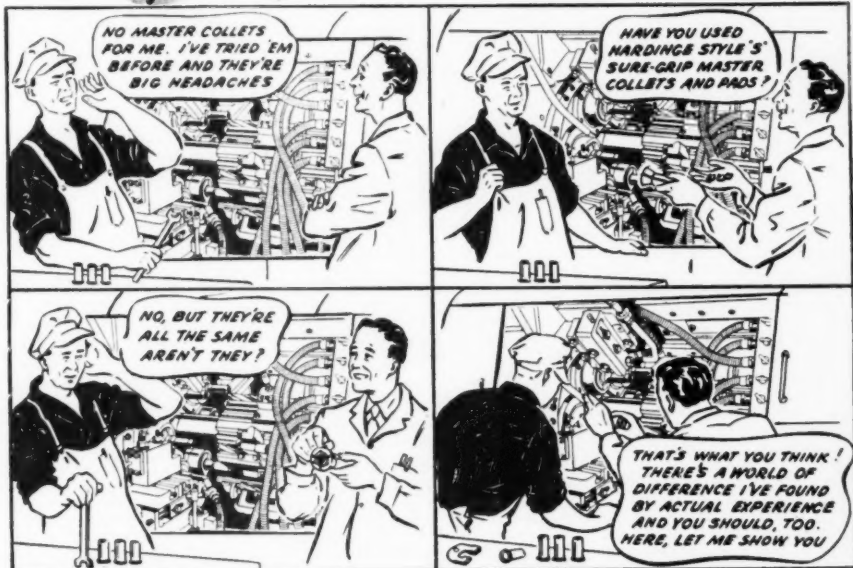
SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

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**Master Collet Performance**  
*until you use*  
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**Here is the BIG difference —**

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*Quality*  
**TOOLS**



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Published Monthly

Volume 45, No. 3



# Machine and Tool BLUE BOOK

MARCH, 1949

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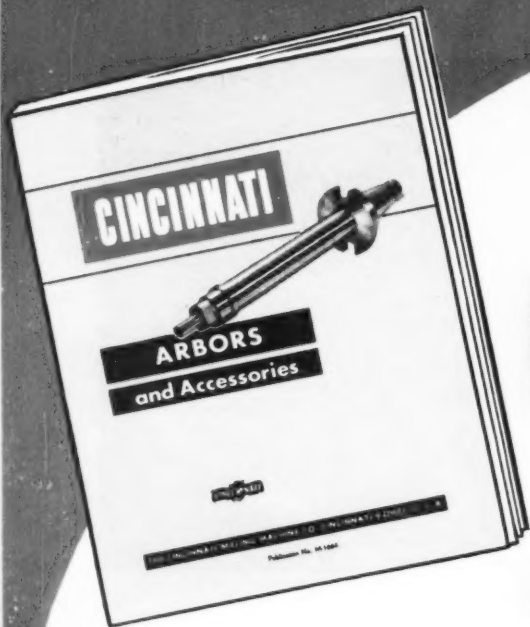
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*Help you get the  
out of your*

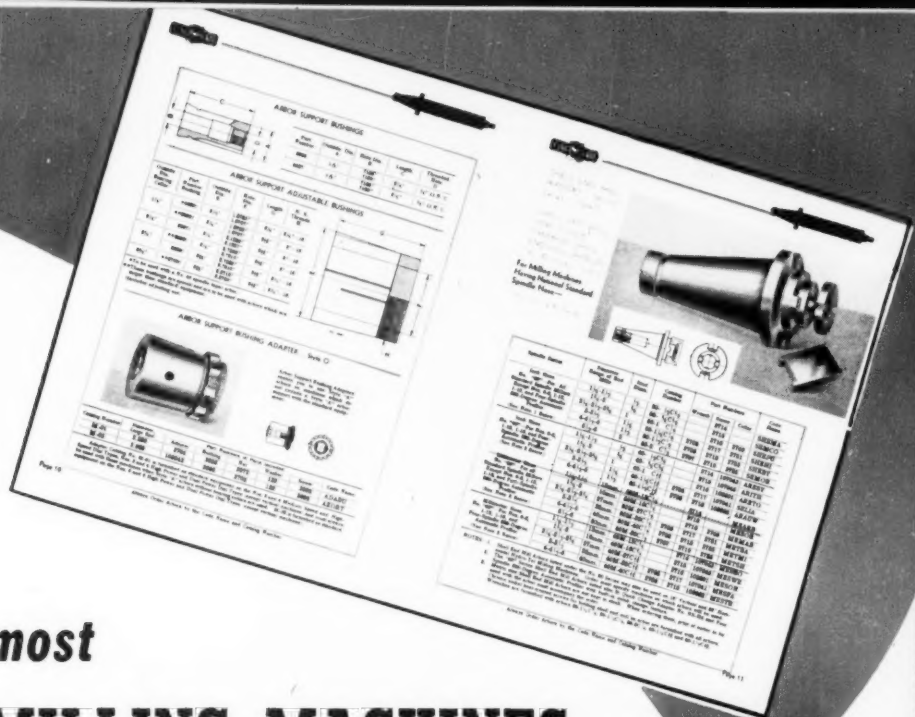
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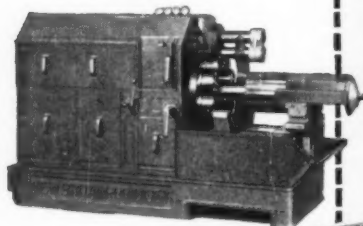
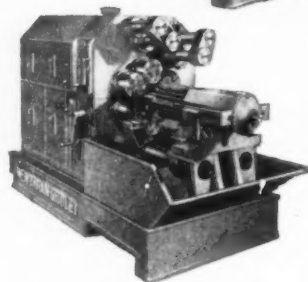
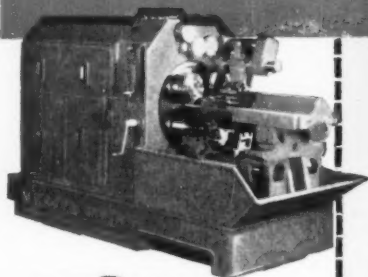
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**HYDRAULIC CHUCKING** for simple positive control and rapid action. Automatic pressure reduction in finishing positions.

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**CARRIER LIFTING, LOCATING AND LOCKING MECHANISMS** during index preserve accuracy by eliminating carrier wear and weave.

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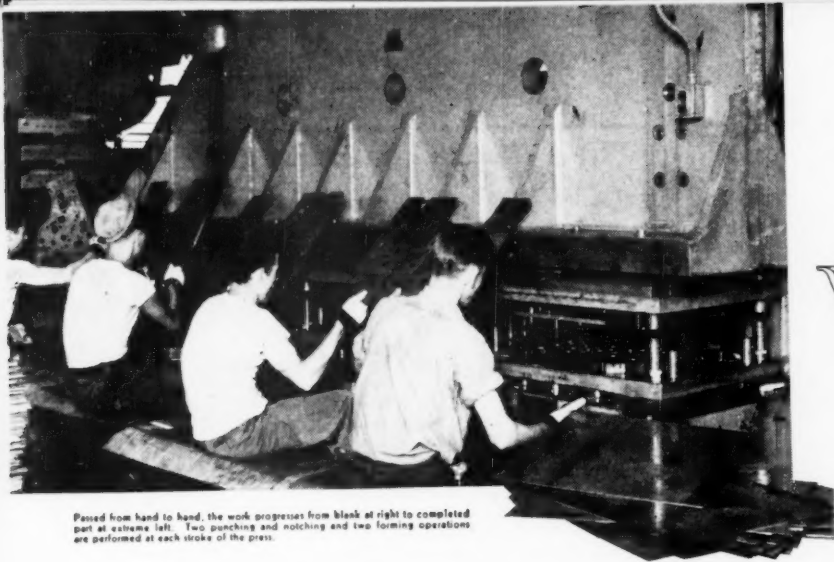
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## **NEW BRITAIN**

*Automatics*

THE NEW BRITAIN MACHINE COMPANY  
NEW BRITAIN-GRIDLEY MACHINE DIVISION  
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Passed from hand to hand, the work progresses from blank at right to completed part at extreme left. Two punching and notching and two forming operations are performed at each stroke of the press.



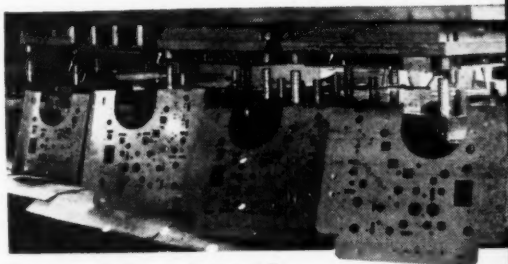
# OPERATION TELEVISION...

This television chassis, a modern product made in the modern manner on a Cincinnati Press Brake, is produced from blank to completion in one stroke—four simultaneous operations on one machine.

281 holes, tabs and notches are punched, and three sides are formed at each stroke—to close tolerances.

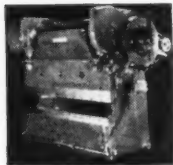
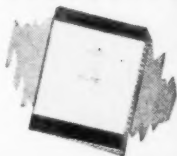
Cincinnati wide beds and rams—either fixed or detachable—for large area work, are highly productive on jobs of this kind.

You may find you can do it for less on a Cincinnati Press Brake.



Photo—Courtesy Rex Engineering Co., Cincinnati, O.

Write for technical Bulletin 155,  
a compact treatise on Press Brake  
practice, dies and applications.



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pays big dividends every minute  
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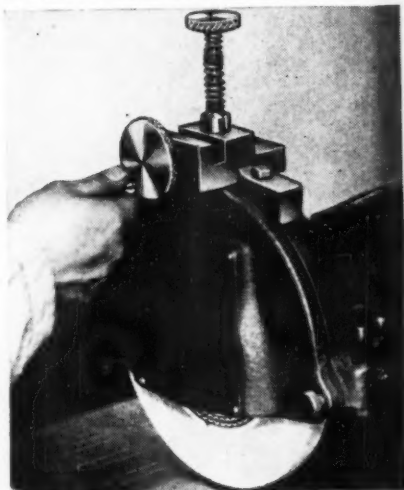
**DESIGNED FOR LIFETIME USE**

**SAVES TIME BY ELIMINATING**

- Machine stopping for dressing
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- Lowering and raising wheel head . . . THE HIGHER THE WORK, THE MORE TIME SAVED!

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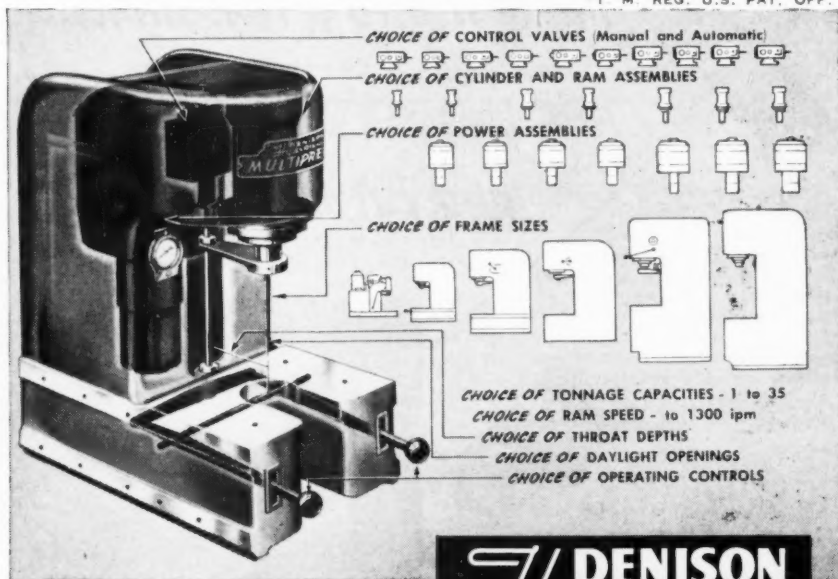


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HydrOILics

# How Hard *are GISHOLT'S* *Hardened Ways?*

**to show you . . .**

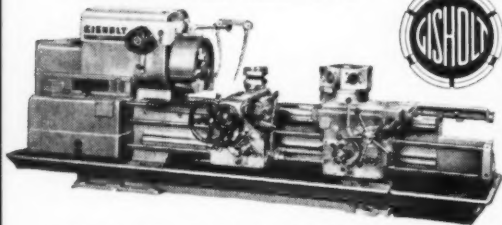
*We took a section from  
the bedways . . .*

*made it into a tool bit . . .*

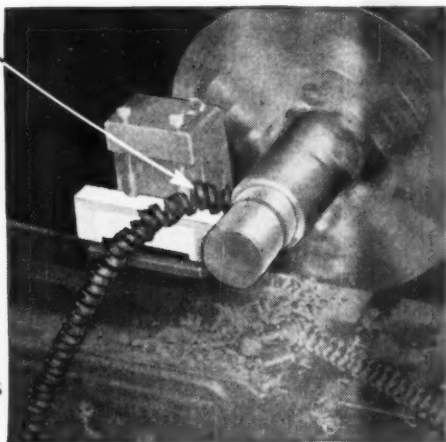
*and cut metal with it!*

Here it is, turning a shaft of 1045 cold rolled steel. This illustrates how precision is "hardened" into Gisholt Turret Lathes with all working surfaces hardened to 64-66 Rockwell C on ways, gibs and clamps. This extreme hardness makes Gisholt ways practically wearproof—insures life-long accuracy—the kind of accuracy you want specified in your next turret lathe.

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## Phillips, Frearson, Slotted, Socket or Hex Head Screws—



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No matter what make of electric, air or spiral driver you use, Apex has the *right* bit for driving the types of screws listed above.

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*"Just what  
the Doctor ordered"*

**TO KEEP WORK  
AND TOOLS COOL**



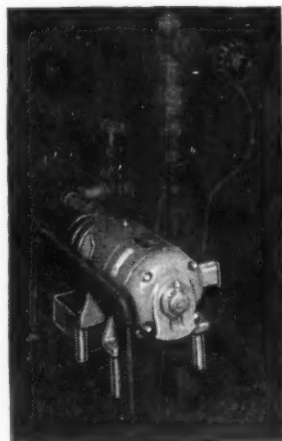
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Scores of designs are available . . . and if you need something very special, we build that, too. Pipe sizes:  $\frac{3}{8}$ " to  $1\frac{1}{2}$ ".

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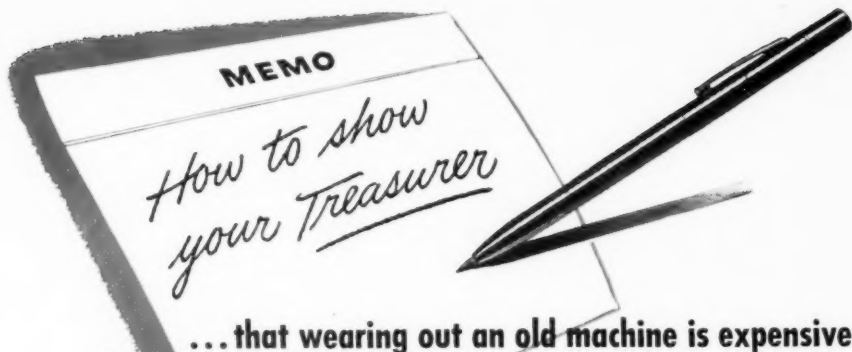
WRITE on your letterhead for personal copy of FULFLO MECHANICAL DATA BOOK.



THE



**Specialties Co., Inc.**  
**BLANCHESTER, OHIO**



Of course, you know that an obsolete machine, even with its low carrying charges, usually costs more to run than a new one. Your treasurer probably knows that, too; but it won't hurt to remind him that the best time to replace old machines is before they are completely amortized on the books. For, an automatic five years old is dangerously below today's Acme-Gridley production standards.

If you have seen new Acme-Gridley Automatics in action, you know that doubled production is not uncommon. Maybe we could help you prove this point for your treasurer—by placing in your hands more case histories of the actual experiences of some of our customers—down-to-earth records of dollars saved with new Acme-Gridley Automatics. Here's a typical example:

CUT THIS OUT FOR USE WHEN YOUR TREASURER WANTS PROOF

### AN ACME-GRIDLEY CERTIFIED CASE STUDY

**MACHINE**—2" RB-6 Spindle Acme-Gridley Automatic

**PART TURNED**—Steel Eccentric Bushing

**MACHINING TIME**—17½ seconds—for 15 operations

**FORMER METHOD**—Blank out on automatic, then, on second machine, finish eccentric shoulders, internal recess and gouge O.D.

**PRODUCTION INCREASE**—300%



**ACME-GRIDLEY BAR and CHUCKING AUTOMATICS**

built in 4, 6 and 8 spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

## THE NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

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# ***FIRST IN LINE FOR '49!***

## **IT'S INDEX AGAIN**

***The Milling Machine  
That Means Savings  
For You . . .***



*Write for  
Literature  
or See Your  
Local Dealer*

During the past year the new Model 50 Index Milling Machine has proven its great scope of usefulness in a wide variety of production line and general tool room jobs. Operational analysis has also shown that Index leads in savings on production time and labor over any other machine of comparable size or cost.

In addition to the freedom from chatter and solid rigidity built into the machine, each control and working part operates with smooth, accurate precision to hold fine tolerances. The ease with which any necessary rate of spindle and table feed can be obtained and the rapid traverse for re-positioning puts the Index Milling Machine definitely on the production line.

A complete line of accessories is available including end measuring rods and indicators, right angle milling head, both hand and power operated precision rotary tables and indexing attachments.

# **INDEX MACHINE CO.**

**545 N. MECHANIC STREET**

**JACKSON, MICHIGAN**



# SUN OIL COMPANY announces **LUBEWAY**

A trade-mark of Sun Oil Company

## A COMBINATION HYDRAULIC OIL AND WAY LUBRICANT

LUBEWAY was developed in co-operation with leading machine tool builders for use in metal-working equipment in which the way lubricant is force-fed from the hydraulic system. Lubeway has been thoroughly "Job Proved" in industry. Send for free booklet containing complete information about this new product.

**SUN OIL COMPANY • Philadelphia 3, Pa.**  
*In Canada: Sun Oil Company, Ltd., Toronto & Montreal*

Sun Oil Company, Dept. MT-3  
Philadelphia 3, Pa.

Please send me your informative booklet  
on the new Sun Product—LUBEWAY.

Name

Title

Company

Address

City  State

## SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY





The Spindles pictured are among the most popular and widely used of the many *Pope Sealed Package Spindles*.

*These Spindles assure you:*  
**Continuous Production of High Quality**  
**Cool Operation at High Speeds**  
**Sealed Lubrication Performance**  
 — no oiling or greasing, nothing to renew, replace or adjust throughout the entire life of the bearings.



This new P-32T 6" x 18" Surface Grinder Spindle is a complete Sealed Package. It has a full 1 H.P., 3450 RPM totally enclosed motor. It is the outstanding spindle for surface grinding. Ask for the Pope Sealed Package Spindle, P-32T.



This Pope Tool Grinder Spindle is equipped with 1 H.P., 3450 RPM totally enclosed motor; for grinding wheels up to 8" O. D., 1/4" face, 1 1/4" hole. *Sealed Lubrication.* Ask for P-1004.



This Pope Heavy Duty Spindle with totally enclosed fan cooled motor is ideal for surface grinding. It can be mounted on planers and boring mills. It comes in a variety of sizes from 1/4 to 20 H.P. and from 900 to 3600 RPM. *Sealed Lubrication.* Ask for P-2500.



This Pope Heavy Duty Vee Belt Driven Wheel Head Spindle takes grinding wheels from 6" to 36" diameter. Maximum speed 4000 RPM. Ask for P-666.

No. 58

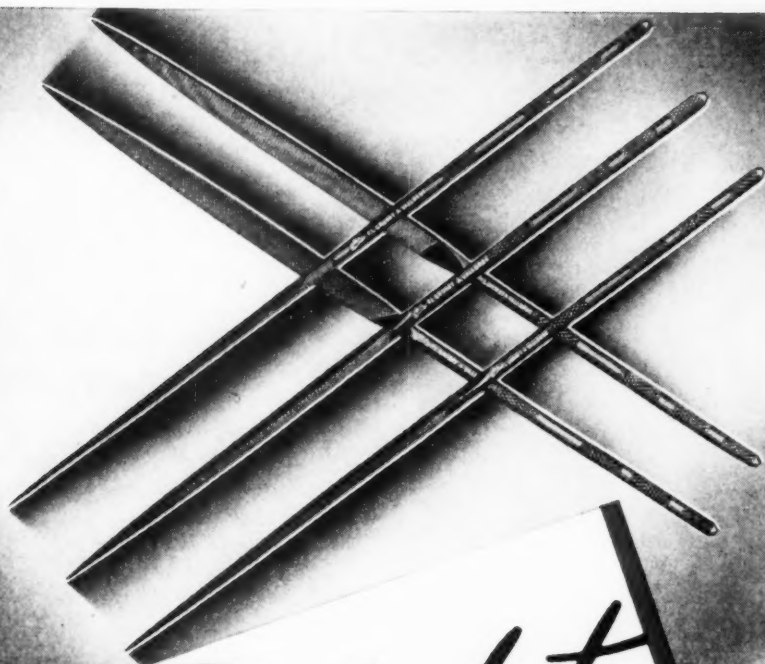
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TRADE MARK REG. U.S. PAT. OFF.

**POPE MACHINERY CORPORATION**

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS  
**BUILDERS OF PRECISION SPINDLES**



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PRODUCES MORE NEEDLE FILES and other  
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SOLD THROUGH LEADING SUPPLY HOUSES



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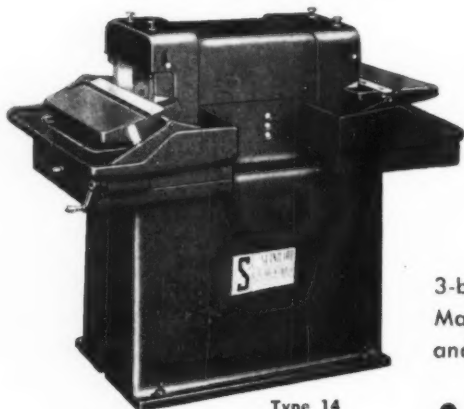
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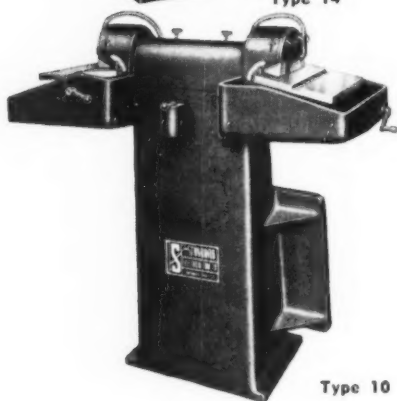
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# CARBIDE TOOL GRINDERS

## WET OR DRY GRINDING!



Type 14



Type 10

### • MOTORS

Reversible 3 H.P. on Type 14.  
1 H.P. on type 10.

### • REVERSING CONTROL

3-button Push Button and Reversing  
Magnetic Starter having overload  
and under-voltage protection.

### • WORK TABLES

Table assembly, guard and splash  
pan adjustable through screw feed.  
Steel wear plate on each table.

### • WET GRINDING

Copious supply of coolant. Adjust-  
able nozzles.

### • DRY GRINDING

Quick, built-in conversion to dry  
grinding.

**Substantial construction for vibration-free operation—  
for fast, accurate and volume grinding!**

Base incorporates coolant reservoir, settling chamber and drain for cleaning and  
flushing. Includes protractor guide and diamond holder and unique guard design  
with adjustable splash guards for spray control.

*Write today for complete information. Bulletin ML3 gives the facts!*

## THE STANDARD ELECTRICAL TOOL CO.

2486 RIVER ROAD

CINCINNATI 4, OHIO

# Mall Rolling GRINDER

REG. U.S. PAT. OFF.

## Cuts Material Handling Costs



Extra loading, hauling, unloading, wear and tear on a product moving it to a stationary grinder are eliminated when you roll a Mall Flexible Shaft Grinder up to the work.

Because the motor is not carried by the worker, but is mounted on the easy-roll stand, a larger, more powerful motor containing more iron and copper can be used to safeguard against overloading and "burnouts." The light weight working tool is more comfortable and easy to hold and handle than one with the motor built in. Thus, larger areas can be covered faster, with less effort. The several attachments for Grinding, Sanding, Wire Brushing and Polishing can be changed in a jiffy.

*This tool will pay for itself in your plant before you realize it. Let us prove this to you at our expense. Write at once for FREE Demonstration Offer, literature, prices and name of nearest dealer.*

Direct Drive, Geared Head and Counter Shaft Models  $\frac{3}{4}$  H.P. to 3 H.P.

**MALL TOOL COMPANY**

7742 South Chicago Avenue

Chicago 19, Illinois

*Preferred by Master Craftsmen*

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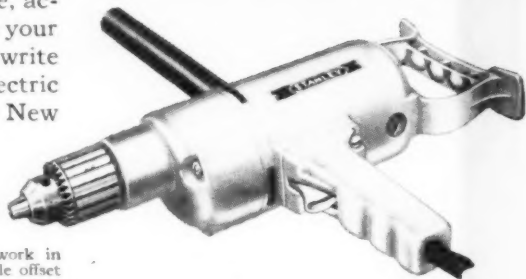
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# Speed up

MAINTENANCE WORK

AND ODD PRODUCTION JOBS

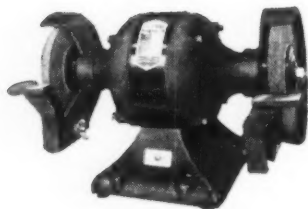
Three Stanley Electric Tools that cut corners on time-consuming jobs. Easy to use, accurate, long wearing. See your industrial distributor or write for catalog. Stanley Electric Tools, 512 Myrtle St., New Britain, Conn.



**New  $\frac{1}{2}$ " Electric Drill No. 112.** For work in hard-to-get-at places. Chuck spindle offset permits operator to drill in close quarters without removing pipe or spade handles. Tough aluminum alloy housing, thrust ball bearing on spindle, automatic release safety switch, alloy steel gears, heavy rubber-covered 3-wire cable.



**New Tiny 218 UNISHEAR.** Weighs little more than a pair of snips but cuts faster, cleaner, easier. Needs only guiding. Cuts right to the line... curves, angles, notches... with hairline accuracy. Strong aluminum alloy housing, slide-operated switch, duplex handle.



**New Bench Grinder No. 266.**  $\frac{1}{4}$  h.p., 6" wheels. Full ball bearing construction, sealed against dirt. Adjustable tool rests permit use at any point of wheel circumference. Extended frame gives large working area around wheels. Guards designed to provide ample room for wire brush wheels.

THE GREATEST NAME IN TOOLS

## STANLEY

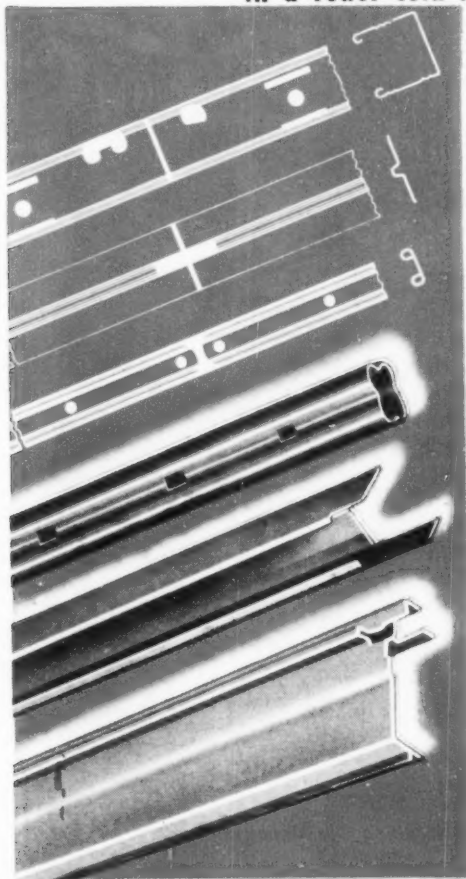
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# 12 examples of Cost Cutting

made possible by combining different operations  
in a Yoder cold roll-forming production line!



## NO. 1 NOTCHING, PERFORATING, MAKING SPECIAL ENDS

In Yoder production lines, sheet and strip can be continuously cold formed, spot or seam welded, embossed, coiled, or curved and cut to length, without rehandling or extra labor cost. Different metals can be simultaneously fed into the machine and combined. Sheets or strip can be continuously slit to exact width . . . edges trimmed, rounded or beveled. Adhesives and other viscous liquids can be injected to fill openings, seams or grooves. Rubber, felt, plastics, etc., can be inserted and many other operations performed. Production ranges from 25,000 to 50,000 feet per 8-hour day with one single operator.

Illustration No. 1 is a Venetian blind header, No. 2 a furnace jacket ring, No. 3 a baby carriage section, No. 4 a lock-seam cloverleaf tube, Nos. 5 and 6 a window frame and sash section respectively. All the notches, perforations and special end profiles are made with special dies mounted in a Yoder automatic flying cut-off machine, synchronized with the roll forming machine. Into this line-up coiled strip is continuously pulled to be formed, notched, perforated and cut off at the rate of 100 f.p.m. or more, coming out at the other end as individual straight lengths, so accurately shaped and dimensioned as to be ready for immediate use or assembly.

Yoder engineers are anxious to cooperate with yours in developing similar high-production, low-cost methods to suit your individual needs. Literature, estimates and recommendations for the asking.

**THE YODER COMPANY**  
5509 Walworth Ave. • Cleveland 2, Ohio



**ROLL FORMING, TUBE MILL AND  
SLITTING MACHINERY**

36 YEARS' LEADERSHIP • COILING • SLITTING • FORMING • EMBOSSED • CURVING • WELDING • CUTTING-OFF

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FIND OUT ABOUT THE

# Milmaster

IT CONVERTS ONE MACHINE  
INTO A TOOL SHOP

## PAYS FOR ITSELF...FAST

MILMASTER—a milling attachment for vertical and other machines—reduces the number of set-ups and increases production. Efficient in nearly any position. Outstanding for horizontal, end and angle milling; drilling, boring, sawing, slitting, reaming, cutting racks, hobs, and broaches. Milmaster is strong, accurate, precision-built—equal to severest conditions. Several attachments available. Mail coupon today.

**BEMIS & CALL CO.**  
Springfield, Mass.



**REDUCE  
COSTS**

**MAIL  
TODAY**

**BOOST  
PROFITS**

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Send me free folder describing the Milmaster  
"that pays for itself in a few jobs."



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HENDEY  
No. 2  
GENERAL  
PURPOSE  
LATHE



## Let's talk 'PRICE'

A good lathe costs money. The new Hendey No. 2 General Purpose Lathe is not an exception, but is an exceptional value. This lathe is an entirely new concept.

It replaces the famous Hendey Cone Head Lathe, but retains all the facility—with a single lever belt shifter. It has eight speeds, but no expensive geared head. A unique feature eliminates belt pull on the spindle. There are 48 thread and feed changes, and graduations permit spindle indexing for cutting multiple threads. The Bed Ways, both Carriage and Tailstock, are hardened and precision ground. Here's a lot of lathe for the money—the price will please. Write today for details and catalog.

### PRINCIPAL DIMENSIONS

|  |                       |
|--|-----------------------|
| Rated size   | 14"                   |
| Swing over ways  | 16 $\frac{1}{2}$ "    |
| Swing over cross slide                                     | 10 $\frac{1}{4}$ "    |
| Spindle bearings—Preloaded super-precision roller bearings |                       |
| Spindle nose   | L-1 taper nose        |
| Hole through spindle                                       | 1 $\frac{1}{2}$ "     |
| Range of spindle speeds                                    | 30 to 1142 R.P.M.     |
| Carriage bearings on ways                                  | 21 $\frac{1}{2}$ "    |
| Width and length of cross slide                            | 7"                    |
| Compound rest travel                                       | 4"                    |
| No. of thread and feed changes                             | 48                    |
| Range of thread cutting                                    | 1 $\frac{1}{2}$ to 92 |

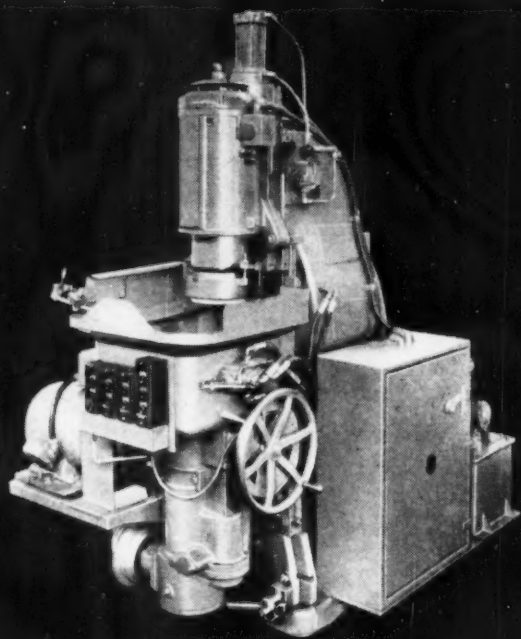
### THE *hendey* MACHINE COMPANY

MAIN OFFICE & PLANT, TORRINGTON, CONN.

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REPRESENTATIVES: Philadelphia, Cleveland, Pittsburgh

*hendey*



*Walker* High Production Vertical Stroke Grinder—the only Grinder of its kind and does not compete with other Grinders. Specially designed primarily for the Saw, Circular Tool and Glass industries.

Can grind flats—convex—concave and bevels to 15 degrees.

Has clearance of 8" hubs and can grind to a combination of radii giving a parabolic curvature.

Electric controlled—hydraulic feed—rapid traverse.

**O. S. WALKER CO. Inc.**

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*Original Designers and Builders of Magnetic Chucks*

*New for '49*

**FAST SPIRAL**  
*Carbide Tipped*  
**TWIST DRILLS**

For more efficient drilling in aluminum, magnesium, bakelite, plastics, etc. Standard in sizes 3/16" to 1/2". Also sizes 1/16" to 1/4" in solid carbide.

**NEW**  
*Carbide Tipped*  
**CORE DRILLS**

A hard wear strip back of each carbide tip extends full length of flute effectively preventing galling or scoring. Increases life of drill and improves finish. Standard in sizes 1/2" to 1-1/2".



*Send for Bulletin*

**SUPER TOOL CO.**

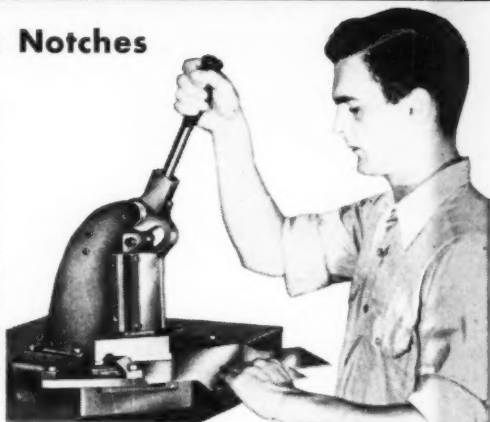
21650 Hoover Rd., Detroit 13, Michigan

5210 San Fernando Rd., Glendale 3, California

# THE **di-acro** NOTCHER

## Duplicates Precision Notches WITHOUT DIES!

The new precision DI-ACRO Notcher is so fast and easy to operate that it is no longer necessary to invest in dies and set up a punch press for many production notching operations. It can be so quickly adjusted for any size or shape notch within its capacity that it is also ideal for experimental or research work. Many straight shearing operations are also possible with this unit.



### CUTS CLEAN—NO BURRS OR ROUGH EDGES

The powerful action of the DI-ACRO Notcher results from an exclusive DI-ACRO designed roller bearing cara which provides a tremendous pressure with a small amount of effort. The precision-ground Vee-shaped ram and blades of alloy tool steel assure clean cuts and permanent accuracy in production runs of duplicated notches.

**LARGE CAPACITY.** The DI-ACRO Notcher will cut 90 degree notches up to 6 by 6 inches in 16 gauge steel in one operation. Larger notches, and wider or narrower angles, can also be cut. A built-in flexible gauging device quickly locates a notch in the desired position and duplicates it exactly.

**SEND FOR 40-PAGE CATALOG**—Get full information on all six "DIE-LESS DUPLICATING" production boosters—DI-ACRO Benders, Brakes, Shears, Rod Parters, Punches, Notchers—and their many applications for experimental work and speedy production of duplicated parts.

DI-ACRO is pronounced "DIE-ACK-RO"

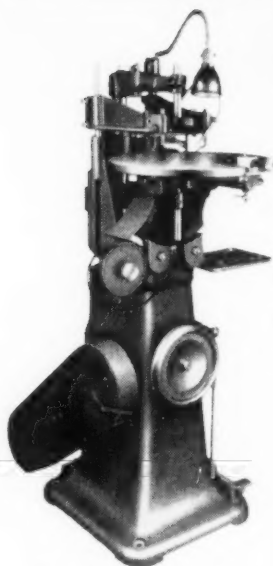


## O'NEIL-IRWIN MFG. CO.

314 EIGHTH AVENUE, LAKE CITY, MINNESOTA

# Put Real *Efficiency* Into Your Die Making

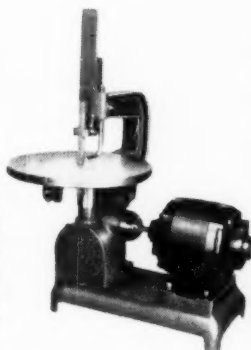
## With Oliver Die Makers



If you still make dies by the old, expensive hand method of drilling and chipping to remove surplus metal, we at OLIVER (and many thousands of users throughout the metal working industry) can show you how to cut your costs by 50% to 60%. Modernize your tool and die rooms—install one or more Olivers—savings will soon pay their initial cost.

**OLIVER  
OF  
ADRIAN**

For thirty-five years OLIVER DIE MAKERS have been cutting die making costs all over the world. Write today for literature describing the various models. Shown above are the Heavy Duty Pedestal Model, for sawing, filing and lapping in tool steels up to 3" thick; and the Bench Model S-1, for work up to 1" thick. Prices are reasonable.



**OLIVER INSTRUMENT CO.**

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IMPROVE YOUR TOOLROOM  
IT'S THE BACKBONE  
OF PRODUCTION

**OLIVER**  
OF ADRIAN

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DIEMAKING MACHINES



# Cut "set-up" time Slash toolroom grinding costs



## with the New RIVETT 1024 TOOLROOM GRINDER

At long last! — a toolroom grinder that *does* something about "set-up" costs, far and away the most expensive item in toolroom and small lot grinding. On internal and external grinding work on straight, taper, two-angle, face and shoulder surfaces, Rivett 1024 has these *new* features to help you cut "set-up" time drastically:

1. **Double-end wheelhead** — Exclusive! Two spindles on swiveling wheelhead make possible rapid changes to internal or to external work. 2. **Hydraulic table reciprocation** — infinitely adjustable for speed and length of travel. 3. **Graduated swivel table and sine bar on workhead** — assure accurately measured tapers and angles. 4. **Optional work holding methods** — uses collets, step chucks, jaw chucks, plates, fixtures or "on-centers." 5. **Adjustable spindle speed** — internal from 6,000 to 35,000 r.p.m.; external 1800 or 2100 r.p.m.

And that's not all — the Rivett 1024 Grinder has been specially designed to extend the *range* of your grinding operations . . . double slides and swivels on cross slide increase possible "set-ups" including double angles at one grind . . . external wheel can be mounted on either end of spindle to permit face and shoulder grinding using periphery of wheel . . . positive table stop with micrometer adjustment positions work.

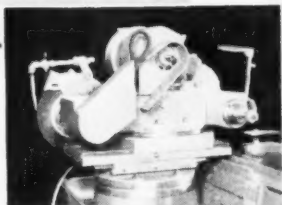
### CUT COSTS ON TOOLROOM GRINDING

Bulletin 1024 tells the whole story in pictures and helpful technical information. Write for your copy today.

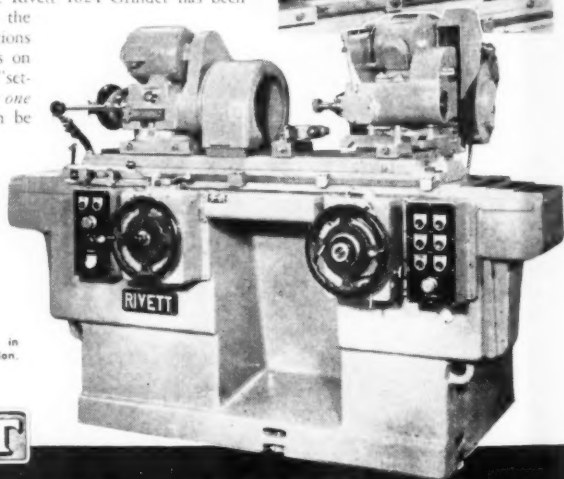
# RIVETT

## RIVETT LATHE & GRINDER, INC.

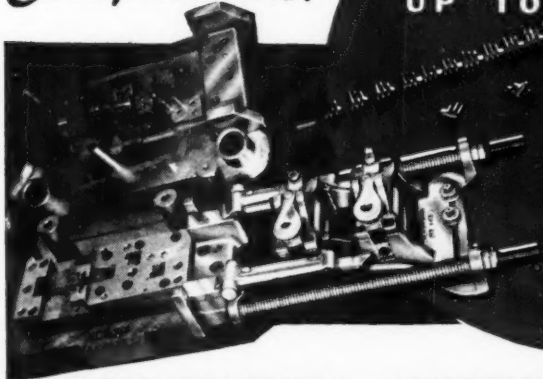
BRIGHTON • BOSTON • MASSACHUSETTS • U. S. A.



**New!** Double-end wheelhead carries both internal and external spindles . . . swivels 180° to position either spindle. Found only on the new Rivett 1024!



*Don't Bow to  
Competition!*



**REDUCE  
OPERATOR  
HOURS  
UP TO**

**90%**

**INCREASE  
PRODUCTION**

**As Much As**

**300%**

## **DICKERMAN AUTOMATIC DIE FEEDS ARE DOING IT DAILY!**

Stop wasting time by hand feeding or using worn or obsolete punch press feeds. The modern Dickerman Die feeds may be attached to any press in any required position. They will accurately feed any Metal, Paper, Fibre,

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*This Abrasive Can  
Really Cut Grinding Costs*



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# ... It's 32 ALUNDUM<sup>®</sup>

The Sensational Norton Development

## Cuts Faster—Cuts Cooler

32 ALUNDUM abrasive is entirely different from any other abrasive—made differently by a unique Norton-developed process. There's no crushing to size—each grain forms in the electric furnace as a single, complete, multi-pointed crystal. The result is a grinding wheel that's sharper—that cuts faster and cooler.

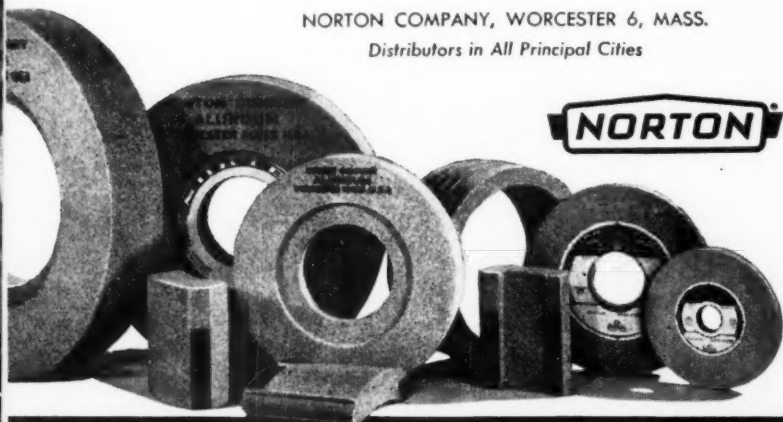
## Fewer Dressings—Longer Wheel Life

The grains of 32 ALUNDUM abrasive are over 99% pure fused alumina—no non-cutting slag or pores. This means grains with greater resistance to dulling—resulting in fewer wheel dressings, longer wheel life.

The cost-cutting ability of 32 ALUNDUM grinding wheels has been definitely proved—by steadily increasing use in thousands of plants. They can cut costs for you, too. Try them for cylindrical, centerless, surface, gear, tool and internal grinding. Ask your Norton abrasive engineer or Norton distributor for specific recommendations for your jobs.

NORTON COMPANY, WORCESTER 6, MASS.

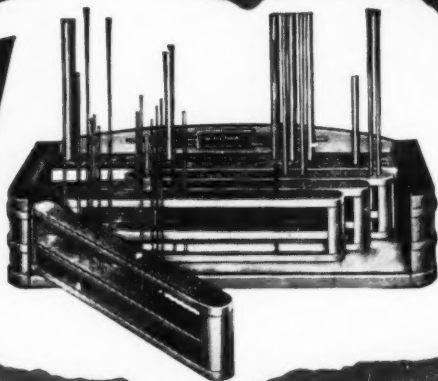
Distributors in All Principal Cities



NORTON COMPANY, WORCESTER, MASS., New York, Chicago, Detroit, Cleveland, Philadelphia, Pittsburgh, Hartford, Denver, Los Angeles

## NEW! ACRO DRILL ROD RACK

Here is a tool room unit you need to cut costs. Pays for itself several times over in time and labor savings alone.



### COMPACT! BIG CAPACITY!

Holds 495 three-foot lengths in 133 number, letter, and fractional sizes including 1". Takes up shelf area only 27" wide x 12½" deep.

- Each rod fits its individually sized hole.
- Holes plainly marked in sizes with their decimal equivalents.
- Instant rod selection.
- Stock check-up at a glance.

**Immediate Delivery!**

**Write for complete details.**



### ACRO DIE SET PULLERS

Users everywhere praise this money-saving tool. Indispensable for the grinding, mounting, and fitting of punches. Raises punch holders straight up with no pounding, no prying, no damage to set.

### SAVES UP TO 50% OF DIE-MAKING TIME!

Notice there is no struggle to separate the die set. Indexed Screw Wrenches\* lift holder axially from die shoe. Operator raises or lowers die smoothly, safely, accurately . . . or holds it at any desired height.

Ask for folder of details.  
\*Patented . . . Exclusively Acro

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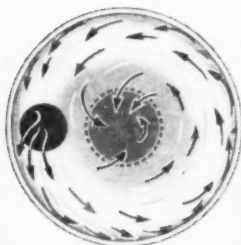
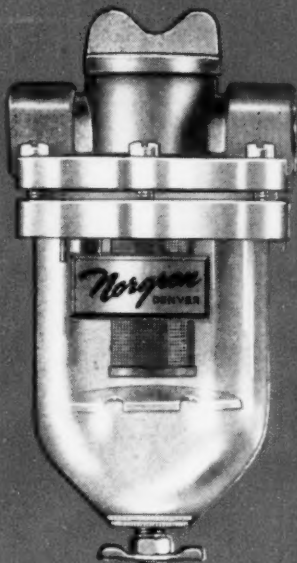
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COMPANY

220 E. BROADWAY, NEW YORK, N.Y. 10003

# Keep Air Power CLEAN and DRY

**N**orgren Transparent Bowl Filters keep air power CLEAN and DRY—for better equipment performance . . . less maintenance cost. New Norgren features prevent moisture, emulsions, rust, pipe scale and other dangerous impurities from entering tools and equipment—thus reducing corrosion and wear. Entirely automatic operation—No moving parts.

Write to C. A. NORGREN CO., 222 Santa Fe Drive, Denver 9, Colorado.

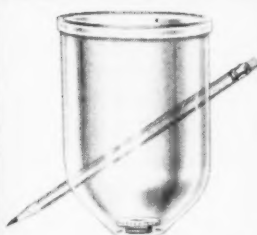
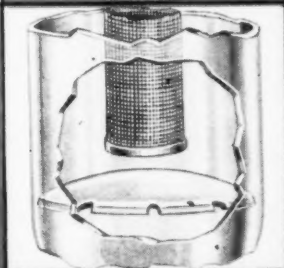


## ▲ "Tornado Jet Action"

imparts swirling motion to air, separating and throwing moisture against outer wall.

## "Baffle Plate"

divides bowl into two zones . . . "Active Zone" where separation takes place, "Quiet Zone" where moisture collects. Double Mesh Wire Screen stops all solids.



## ▲ "Transparent Bowl"

lets you see the filtering action—shows when the bowl needs draining.

"Wherever Air Is Used In Industry"

# Norgren

Lubricators, Regulators, Filters, Valves,  
Hose Assemblies, and other Air Controls.



Now! Magnifications  
as high as

**10,000 to 1\***

\*with the Merz  
**"Vigilant" New-Matic**

Here, *now*, is the one and only air-activated unit—totally unaffected by surface variations—with magnifications as high as electronic gages. It's the Merz "Vigilant" *New-Matic* Measuring Machine, with magnification up to 10,000 to 1, with a range of .0003. Also available with magnification of 5,000 to 1, with a range of .0006. Gives you the highest precision available—for the price of an air gage; Operates on the proved Merz principle of "balanced air." Has the additional advantage of a new adjustment that determines, independently, spread as well as zero positioning. Furnished with Merz' exclusive Sapphire or Diamond button spindle. Conventional jet-type spindle optional. Ask for a demonstration—in your own plant!

**MERZ ENGINEERING COMPANY • INDIANAPOLIS, INDIANA**



**MERZ**

NEW-MATIC MEASURING MACHINES—NEW-TRONIC COMPARATORS AND SORTING MACHINES—  
STANDARD A. G. D. AND SPECIAL GAGES—TOOLS—SPECIAL MACHINERY—EXPERIMENTAL PROJECTS



# Hardest to cut—



## but **DISSTON** Hack Saw Blades do it

### 4 NEW DISSTON HACK SAW FRAMES



*No. 368 Hack Saw frame  
furnished standard with  
top quality Di-Mol blade.*

WHEN YOU BUY A DISSTON PRODUCT  
YOU



**DISSTON HIGH SPEED  
STEEL BLADES** for stainless  
steel, chrome-nickel steels,  
similar alloys, and all 'round  
production work. For both  
hand and machine operation.

**DISSTON DI-MOL BLADES**  
for tool and machine steels,  
cast iron, tubing, and general  
machine shop production.  
For both hand and ma-  
chine operation.

**DISSTON CHROMOL & DURAFLEX BLADES**  
where lower cost hand blades are required. CHROMOL is hard-  
ened throughout. DURAFLEX is a hard edged flexible back blade.

Each supplied in all standard lengths, widths, thicknesses, and teeth  
per inch. New decimal unit packaging is simpler for you.

For sure quality in other metal-cutting tools, specify DISSTON  
American & Swiss Pattern Files... Circular Saws... Carbide  
Fitted Circular Saws... Metal Cutting Band Saws on Safety Reels.

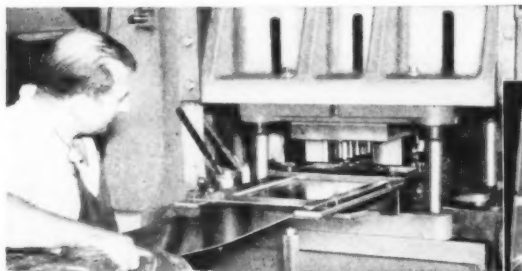
*Order from your Disston Distributor. Ask him for booklet, "Disston  
Hand and Machine Hack Saw Blades". Or write direct.*

**Henry Disston & Sons, Inc.**  
349 Tacony, Philadelphia 35, Pa., U. S. A.

Canadian Factory: 2-20 Fraser Ave., Toronto 13, Ont.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

35



**4000  
PER DAY**

**28,000 STAMPING OPERATIONS WITH**

# PRODUCTO DIE SET

*Near Neighbor  
SERVICE*

ATLANTA: Main 4451  
BALTIMORE: Fidia 0140  
BIRMINGHAM: 54-0201  
BUFFALO: MACH 1115  
CAMDEN, N.J.: 4-7745  
CHICAGO: Century 4000  
CLEVELAND: Superior 9-109  
DAYTON: Medium 5-001  
DETROIT: 3-1170  
ELMHURST: 5-1100  
ERIE: 5-4175  
GREENSBORO, N.C.: 5-0000  
INDIANAPOLIS: Franklin 3018  
LOS ANGELES: 4-0100  
MIAMI: 3-0184  
MONTREAL: 5-1000  
NEW YORK: 2-1400  
PHILADELPHIA: Lombard 3-4400  
PITTSBURGH: Avenue 4-115  
ROCHESTER: Main 5240  
ST. LOUIS: Jefferson 4805  
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**AND PROGRESSIVE DIE**

With the use of a Producto 4 Post Die Set and modern die design, the Trumbull Electric Manufacturing Co. has stepped up production, increased accuracy and cut unit costs. The operations of this particular die include...cut box corners, pierce holes, cut knockouts, bend, form welding projections, set back knockouts, and cut off. (One other operation finishes box forming.)

*Material:* Coiled 10-9/16 x 16 ga. C.R. steel is hand fed to die from automatic coil cradle. *Tolerances* of  $\pm .005$  are held in some cases, and slightly higher on other operations. *Die size:* 23-3/4" x 18". *Press:* 160 ton Bliss.

Through the complete manufacturing cycle Producto Standard and Special Die Sets are held to the strict requirements established for every phase of machining. When your set is ordered from "Near Neighbor Service," there's no lost motion...no red tape. Shipment is fast...plus values built into your sets assure long, low-cost service life. Specify PRODUCTO.

**THE PRODUCTO MACHINE COMPANY**

980 HOUSATONIC AVE.  
BRIDGEPORT 1, CONN.  
TEL. 4-9481



*Phone for "Near Neighbor" Service*

# "LOGAN"

**SINCE 1916...** recognized throughout the industrial world as the mark of dependability in Fluid Power.



★ **PLANT CAPACITY**—A fully equipped, modern plant with a floor space of 100,000 square feet.

★ **MANUFACTURING KNOW-HOW**—The men who actually build the Logan products have an average of 10 years' experience with the company.

★ **LOGAN PRODUCTS**—Chucks, Cylinders, Valves, Presses, Sure-Flow Coolant Pumps in both standard and special air and hydraulic equipment.

★ **ENGINEERING SERVICE**—A staff of competent engineers is available, without charge or obligation, to help you solve your production power problems.

#### **FREE CATALOGS**

Advise us of your requirements. Our catalog covering such equipment will be mailed promptly.

#### **LOGAN**

**Air and Hydraulic Equipment  
Saves Time, Effort, Motion**

## **LOGANSPORT MACHINE CO., INC.**

**807 Center Ave., Logansport, Ind.**

**FLUID POWER SPECIALISTS SINCE 1916**

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

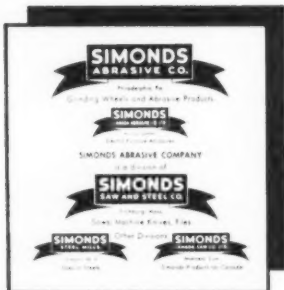


## How tough is tough ?

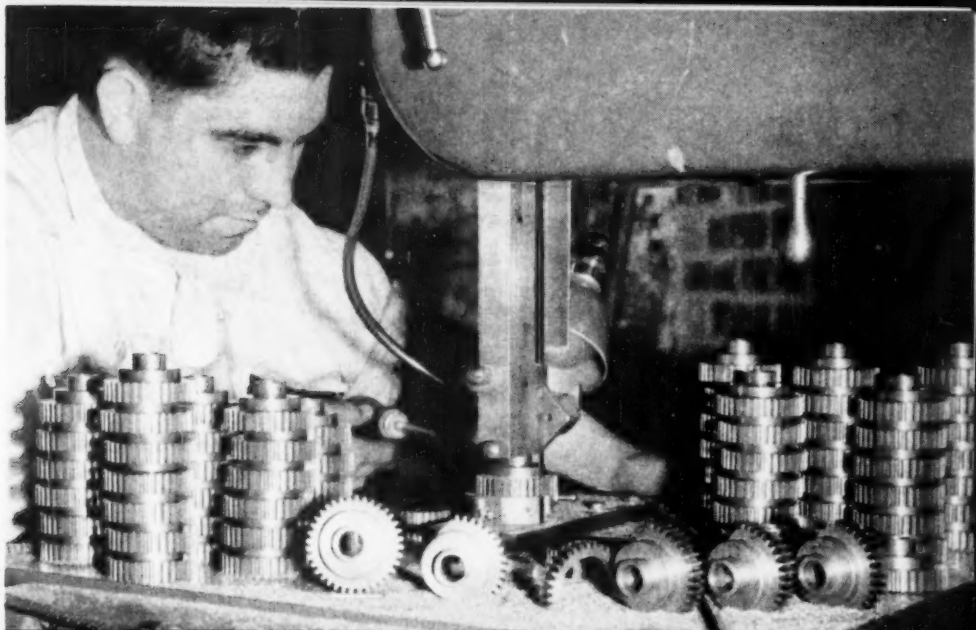
A grinding wheel is tough . . . plenty tough when it takes the severest operating use at 9,500 surface feet per minute . . . yet cuts fast and stands up to give you lowest wheel cost per pound of metal removed.

That's what you get from Simonds Abrasive Co. Snagging Wheels for cleaning castings and billets . . . as well as from other kinds of Simonds Abrasive Wheels used in the precision grinding field.

Send for your copy of our Grinding Wheel Data Book giving complete information including recommendation tables and address of nearest distributor equipped to serve you locally.



**SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA; DISTRIBUTORS IN PRINCIPAL CITIES**



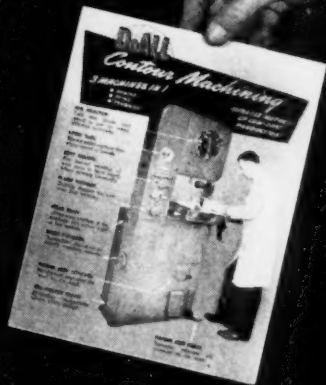
# Sawing Out Gears, Cams and Other Machine Parts

There's a good reason why many industries use DoALL Contour Sawing in the manufacture of countless machine parts such as sector gears shown above, cams, levers, tools and other products. It's because Contour Sawing is the world's fastest precision method of removing metal. Run at infinitely variable speeds for greatest efficiency, razor-sharp bands slice metal quickly and accurately. Send for "Contour Machining" circular which gives further data.



## DoALL Co.

World-Famous Contour Saws  
Des Plaines, Illinois



# IT'S THE ABER CURVE

*That makes One cutter  
do the work of Four!*

**Batchet Plate**  
— 48 Teeth

**Machine:**  
MATERIAL: 4620 Steel  
DEPTH OF CUT: 9 32" x 3 16"  
FEED: 200  
S.F.M. SPEED: 360  
PIECES PER GRIND: 180

**COMPARATIVE PERFORMANCE**

| ABER CURVED TOOTH<br>WOODRUFF KEYWAY CUTTER | STANDARD TOOTH<br>CUTTER |
|---|--------------------------|
| Kent Owen Hand Mill                         | Kent Owen Hand Mill      |
| 4620 Steel                                  | 4620 Steel               |
| 9 32" x 3 16"                               | 9 32" x 3 16"            |
| Hand Feed - Plunge Cut                      | Hand Feed - Plunge Cut   |
| 200   | 180                      |
| 360   | 90                       |

Yes, in an actual test in a large pipe threading company's shop, ONE Aber Curved Tooth Woodruff Keyway cutter performed the work ordinarily requiring FOUR cutters of standard tooth design. This 400% increase in cutter performance is by no means unusual, for Aber's exclusive curved tooth design permits a smoother finish, absence of chatter, greatly increased cutter life, and cuts more freely with far less hand pressure from the operator. In addition, it proved to be a tremendous saver of "down" time, and reduced costs in the cutter grind room.



Write today for your free copy of the new Aber Catalog, containing a wealth of information on the latest developments in the milling cutter field. A sound, practical guide to cutter buying.

**ABER**  
ENGINEERING WORKS INC.  
WATERFORD, WISCONSIN



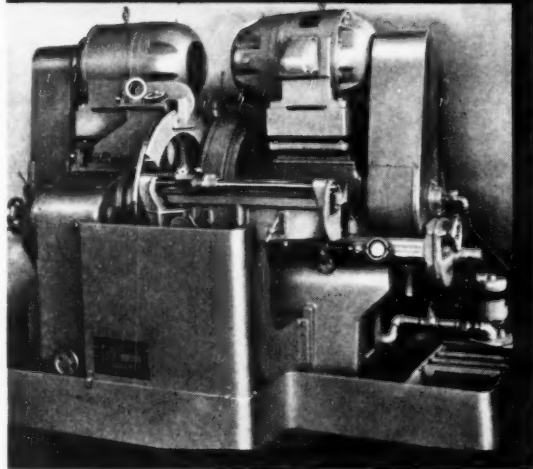
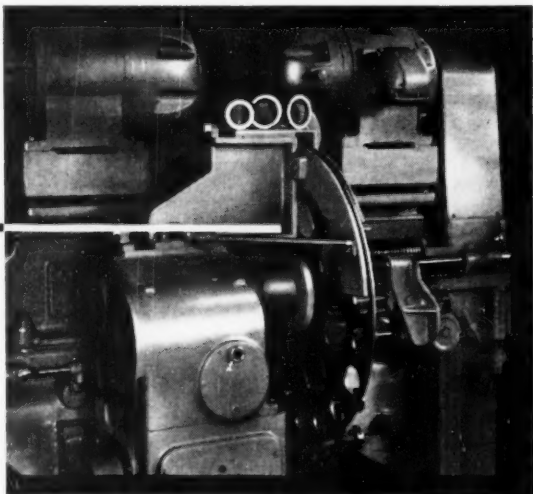
# Cut Your Parallel-Surfacing COSTS RIGHT IN HALF - like *this* with **GARDNER** *Double* **GRINDING**

YOU get more productivity per man-and-machine-hour — more than DOUBLE, in many cases — by grinding TWO surfaces with ONE pass. The parts flow smoothly between two opposed grinding wheels — as fast as they can be fed into and ejected from the machine. Here is a typical example:

## WORK DATA

Part *Gears*  
3.165" OD x 1.26" ID x .495" Thick  
Material *Steel*  
Operation *Grind Two Sides*  
Tolerances *.001" for Parallel;  
.004" to .005" for Uniformity*  
Stock Removal  
*.015" Maximum Overall*  
Production  
*18 to 20 Pieces per Minute*  
Feed *Hand Load to Trough;  
Automatic Unload*  
Machine *"125-26"*  
*Gardner Grinder*  
*With Rotary Work Carrier*

Cut your high labor and material costs by halving your parallel-surfacing operations — on a GARDNER Double GRINDER!



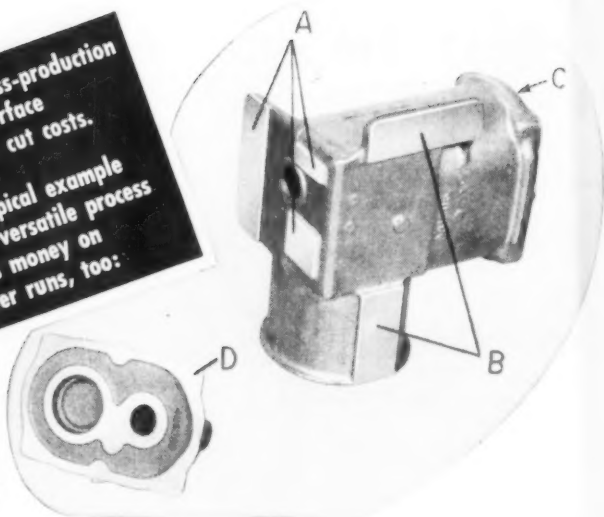
*Write for Bulletin on Gardner Double Grinding*

**GARDNER • GRIND**  
**YOUR Flat SURFACES**

**GARDNER MACHINE COMPANY**  
436 East Gardner Street • • • • • Beloit, Wisconsin, U.S.A.



**You don't need mass-production  
to use surface  
broaching to cut costs.**  
**Here's a typical example  
of how this versatile process  
saves money on  
shorter runs, too:**



## *How to cut Machining costs on castings*

Shown here are two of **three different castings** requiring the machining of **14 surfaces**. The 3rd casting is similar to the larger one.

All surfaces on all three castings are broached on just **one machine**—a Colonial Dual Ram—with a total of **only two broaches**, one for each ram.

Sure a setup like that cuts costs:

*Machining time per face is measured in seconds instead of minutes;*

*One ram returns and is being loaded while the other is cutting;*

*Tools have to be removed only rarely for sharpening;*

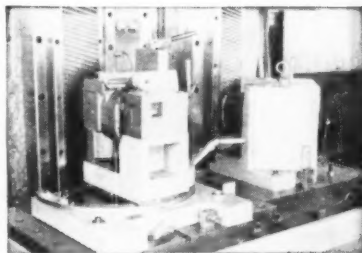
*A simple fixture index eliminates extra set-ups;*

*Tolerances are accurately and automatically held;*

*In-and-out shuttling of the fixtures is automatic;*

*Adjusting screws on fixtures allow for unusual stock variations.*

Of course your jobs may require a different type of surface broaching set-up—say on a Single Ram machine (with one broach); or on a Universal Horizontal. Regardless of the best machine type, the odds are Colonial can show you some real savings on machining of castings. We will welcome the opportunity.



What would you like to know  
about broaching? Drop us a  
line. We'll be glad to help . . .

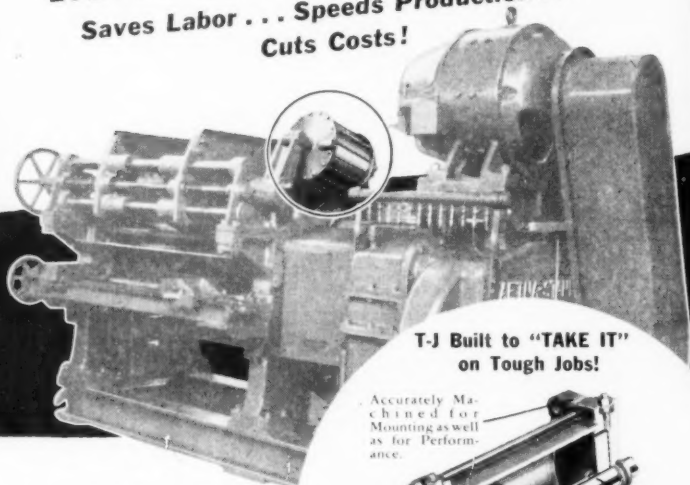


Job File No. 1001

# T-J CYLINDER

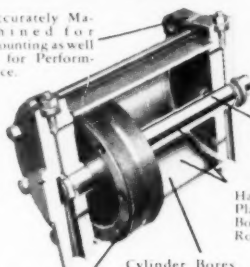
## EJECTS 6-TON STEEL COILS

**Saves Labor . . . Speeds Production . . .  
Cuts Costs!**



### T-J Built to "TAKE IT" on Tough Jobs!

Accurately Machined for Mounting as well as for Performance.



Shouldered Piston Rods.

Hard Chromium Plated Cylinder Bores and Piston Rods.

Self Sealing Packings throughout.

Cylinder Bores Honed Prior to Hard Chromium Plating.

Here's another example of T-J Cylinders doing a job of power movement for industry . . . efficiently . . . accurately . . . automatically. This machine is an Aetna Standard Roll Type Coiler, which employs a T-J Air Cylinder to eject steel coils weighing up to 12,000 lbs. As the strip of steel is completely coiled, kick-out fingers operated by the cylinder raise the coil and push it forward where it rolls on to conveyor.

T-J Air and Hydraulic Cylinders are built for 1001 tough jobs like this, where pushing, pulling or lifting is needed . . . 100 lb. or 50,000 lb. Available in many standard sizes and styles . . . both cushioned and non-cushioned types. Backed by 52 years' experience . . . built for long-life dependability. Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Michigan.

### FOR POWER MOVEMENT IN ANY DIRECTION



100 LB. or 50,000 LB.



32 YEARS EXPERIENCE

## TOMKINS-JOHNSON

RETRACTORS . . . AIR AND HYDRAULIC CYLINDERS . . . CUTTERS . . . CLAMPERS

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# NEW MADISON Grinding Fixture gives you precision tool grinding at a NEW low price

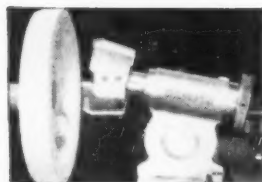


Only \$75.00 for this ruggedly built, soundly designed grinding fixture that handles the many tool grinding jobs with speed and precision. Now even the smallest shop can own one . . . and large shops can have several and avoid any delay in tool sharpening. Although the low price has been made possible by eliminating the expensive adjustments which are so rarely used, in actual practice the scope of this fixture is limited only by ability of the toolman to work out a setup.

The Madison fixture is graduated in all three planes and offers 180° automatic indexing for resharpener Madison cutters and which can be released for conventional handling of other types of tools.

**\$75.00**

less arbors



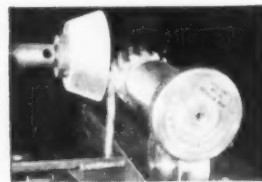
Regrinding face mill.



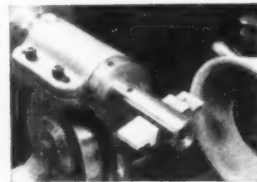
Grinding trailing angle and relief on tool bit.



Regrinding face of end mill.



Resharpener spiral milling cutter.



Regrinding relief angle on Madison reamer cutter.



Grinding lead angle on Madison roughing cutter.

ARBORS FOR MADISON FIXTURE are available for Jacobs chuck, for milling cutters, and for single bit tools, as well as the complete range of arbors for Madison tools, at \$12 each. If needed special arbors will be designed and built by Madison. Quotations upon request.

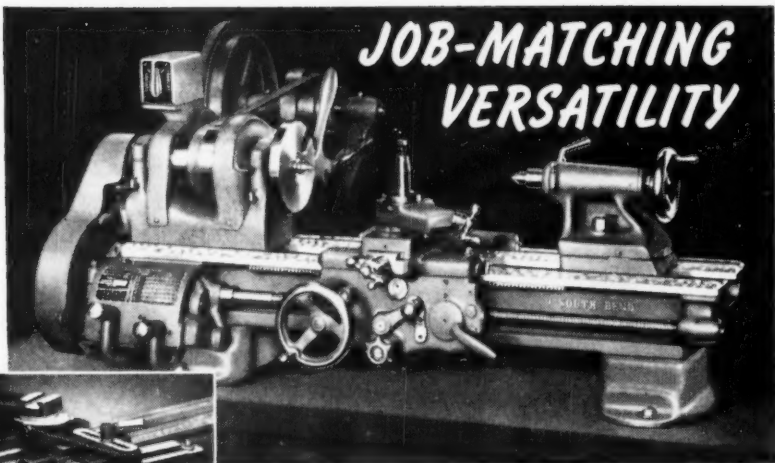
WRITE FOR this NEW color bulletin which describes the Madison fixture in detail.



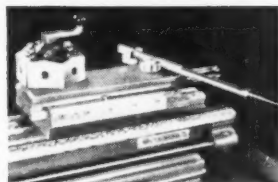
**MADISON** MANUFACTURING COMPANY  
DEPT. BB

MUSKEGON, MICHIGAN

# JOB-MATCHING VERSATILITY



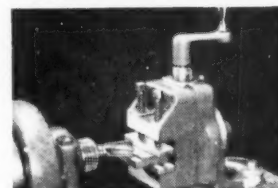
TAPER ATTACHMENT



HANDLE LEVER BED TURRET



SQUARE TURRET TOOL BLOCK



MILLING ATTACHMENT

## SOUTH BEND 9" LATHE

Here's a lathe that cuts machining costs on small precision parts. Its wide ranges of speeds, power feeds and threading feeds provide versatility for practically every job. Numerous job-simplifying attachments make the scope of its work even greater. This enables you to better match the lathe to your jobs. It results in faster operations, greater accuracy, quicker set-ups and the release of heavier machines for heavier work.

Write for catalog or call our distributor listed under "Machine Tools" in your classified telephone book.

### ILLUSTRATED ABOVE:

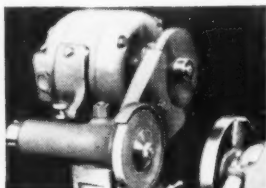
9" x 3' Model A 12-Speed Bench Lathe with 3 phase, 220 V. motor and switch, f.o.b. factory . . . . .

**\$335<sup>45</sup>**

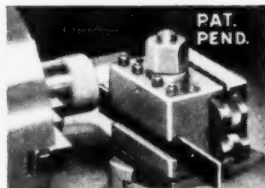
## SOUTH BEND LATHE WORKS

Building Better Tools Since 1906

426 E. MADISON STREET, SOUTH BEND 22, INDIANA



EXTERNAL GRINDER



UNIVERSAL TOOL BLOCK

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# WHYTE

ENGINEERING CO.

## WHYTE ROLL FEEDS

*for Fast, Accurate,  
Continuous Feeding!*

- STOCK MODELS AVAILABLE TO FEED FROM 0" to 12" AND UP TO 14" WIDE
- LARGER MODELS ON REQUEST
- RUGGED WELDED STEEL CONSTRUCTION
- TIMKEN ROLLER BEARINGS
- ALL CUT STEEL GEARS
- EASILY ADJUSTED TO PROPER DIE HEIGHT
- SINGLE AND DUAL FEED AVAILABLE
- ALL FEEDS WITH TWO ROLL LIFTS, AUTOMATIC AND MANUAL FOR CONVENIENT LOADING OF STOCK

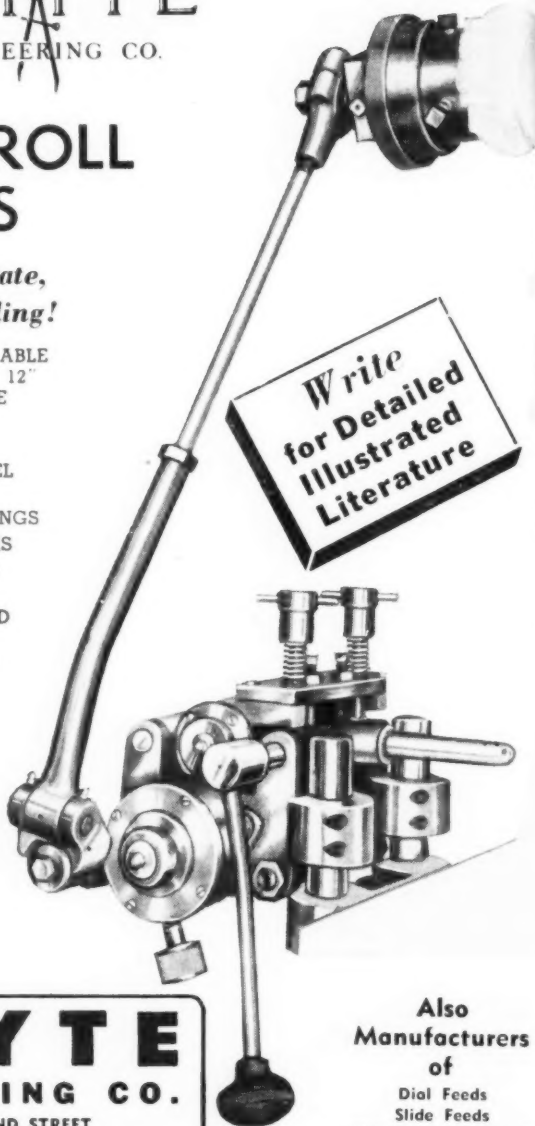


*Immediate  
Delivery*

# WHYTE

ENGINEERING CO.

185-1 ROWLAND STREET  
SPRINGFIELD 7, MASS.



**Also  
Manufacturers  
of**

Dial Feeds  
Slide Feeds  
Pick-Off Attachments  
Stock Straighteners  
Lamination Dies

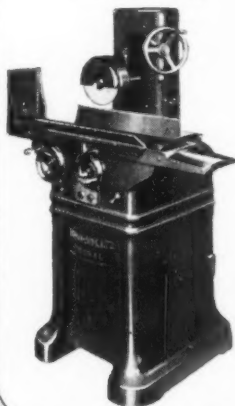
## MODEL 6-12

THE TOOL MAKER'S  
"Personal Grinder"

### MODEL 6-18 SURFACE GRINDER

An extremely accurate Surface Grinder, highly recommended for tool room work and gauge grinding. Its rugged construction and superior engineering assure constant accuracy for a longer period than is usually expected of the ordinary surface grinder.

*Write for Catalog*



## BOYAR-SCHULTZ BENCH MODEL SURFACE GRINDER

This sturdy, accurate Surface Grinder, mounted on the tool maker's bench, is quickly available for many small jobs that would otherwise go to the Grinding Department, interrupting important production runs. It is built with many new features and to the well known Boyar-Schultz standard of quality for close tolerance grinding on tools, dies, jigs, fixtures and gauges. An ideal tool for the small shop.

*Write for Catalog and New Low Prices*

### PEDESTAL FOR MODEL 6-12 GRINDER




Made from heavy gauge angle iron, welded for rigidity and strength. With it, Model 6-12 Grinder becomes a Pedestal Machine.



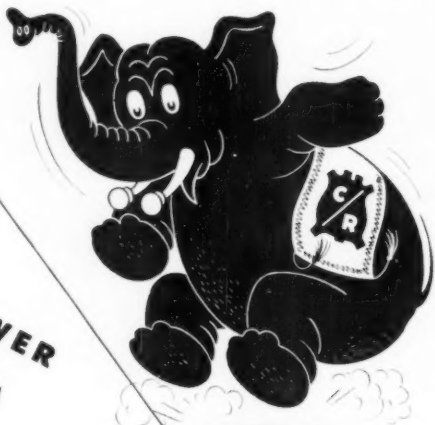
**BOYAR-SCHULTZ CORPORATION**  
2108 WALNUT STREET CHICAGO 12, ILLINOIS

**RAWHIDE** gives you *more* in soft hammers and mallets. And *Chicago Rawhide* gives you exceptional power and maximum protection. C/R hammers and mallets absorb shock, deliver powerful blows, protect finished surfaces and stand up under tough use. For hammers and mallets that never split, crumble or mushroom, always ask for *Chicago Rawhide*.



*C/R Hammers have malleable iron heads with replaceable coiled rawhide faces.*

POWER  
PROTECTION  
LONG LIFE  
DURABILITY  
TOUGHNESS  
BALANCE



**CHICAGO Rawhide MFG.CO.**

1321 ELSTON AVENUE

CHICAGO 22, ILLINOIS

Other C/R maintenance products are: round, flat, twist belting; belt pins and lacing; gears, pinions, gear blanks; aprons, hand leathers; hydraulic packings.



# Chicago "ADJUSTABLE"

## SHOP SPOT LIGHTS

for  
"on the spot"  
Lighting



### MODEL 2000-1B

The CHICAGO Bench model light combines all of the features of our other lights but is designed for horizontal mounting.

This model comes in lengths of 31", 37" and 43". All lights have Underwriters approved sockets, cords and plugs. When ordering be sure to specify length.

**\$7.95 Each in quantities of 12.**

**\$8.55 Each in quantities of 6.**

**\$9.50 Each less than 6.**

All prices are net F.O.B. Chicago, Ill.

FOR INFORMATION ON OTHER MODELS WRITE FOR CATALOG 48AL



### MODEL 2000-2W

The CHICAGO Wall model light is available in lengths of 34", 40" and 46". Ideal for use on presses, lathes, mills, or where direct vertical mounting is necessary.

All models are finished in grey baked enamel and have adjustable shades which are green outside and frosted on the inside. When ordering be sure to specify length.



**Chicago DIE CASTING MFG. COMPANY**

2512 West Monroe Street, Chicago 12, Illinois

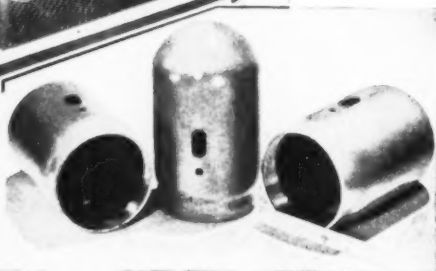
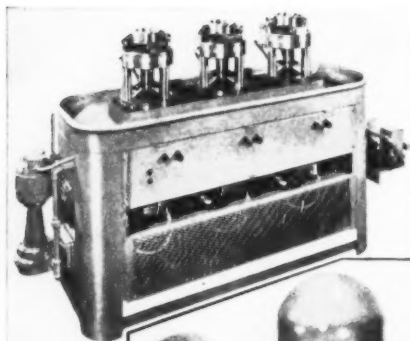


*"Tap it with a*  
**PRUTTON**

*Tapmaster"*

**3 TAPPING  
MACHINES  
IN**

**1**



These GAS CYLINDER CAPS were tapped at a rate of 300-350 per hour on a No. 30 Tapmaster. Tap is a 3½" x 11 pitch of the solid adjustable type. Built for heavy duty tapping, this machine handles the range of 1½" to 4", with production figures varying between 300 and 500 pieces per hour.

WRITE FOR . . .

. . . DESCRIPTIVE BULLETIN

**D. H. PRUTTON MACHINE & TOOL CO.**

5295 W. 130th St.

CLEVELAND 11, OHIO

# LOOK

at this hacksawing record!

## PERFORMANCE of a single "JET-EDGE" Blade

### MONDAY

40 pieces 3¼" Nitroloy

### TUESDAY

50 pieces 1" x 5"  
Cold Rolled Steel

### WEDNESDAY

40 pieces 4½" 50 Carbon  
Chrome Moly Steel

### THURSDAY

10 pieces 4½" 50 Carbon  
Chrome Moly Steel

12 pieces 6"  
Standard Steel Pipe

30 pieces ¾" x 5" SAE 1020

### FRIDAY

4 pieces 6¾" Rytense

**SEE what "Jet-Edge" can do for you.** In metal cutting, records like this mean money saved. "Jet-Edge," that rugged, unbreakable new blade with a super high speed edge welded to an extra strong back, will out-perform the best blade you've ever used. It will actually save you 20% to 50% on your power hacksawing costs, even under toughest cutting conditions.

### WRITE for a free demonstration.

Find out *why* and *how*. We'll be glad to arrange a demonstration on your own work. No obligation — except an open mind for one of the most astounding performances you have ever seen.

MILLERS FALLS COMPANY, Dept. O  
Greenfield, Massachusetts



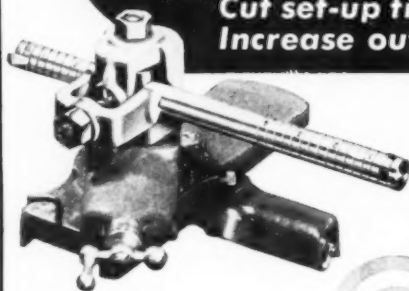
**It's new!  
It's "Jet-Edge"!  
It's Millers Falls!**

The First MAJOR Holder IMPROVEMENT In 25 Years

# GLOBE

## Boring Bar Holder Set

Cut set-up time to a minimum ★  
Increase output ★ Reduce costs



### PATENTED HOLDER

Exclusive dual clamping arrangement permits independent adjustment of bar or alignment of holder—either may be made without disturbing the other. Holder will accommodate all fractional sizes of Bars (within its minimum and maximum capacities) without use of sleeves or bushings.

### COMPLETE SETS (Holder and Three Bars)

| Set No. | Diameter Bar Inches                              | Tool Bit Inches Square                        | For Lathe Swing Approx. | Price Complete |
|---------|--|---|-------------------------|----------------|
| 0-A     | $\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$    | $\frac{1}{8}$ , $\frac{1}{4}$                 | 8" to 12"               | \$ 16.40       |
| 1-A     | $\frac{1}{2}$ , $\frac{3}{4}$ , $1\frac{1}{8}$   | $\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$ | 12" to 16"              | 26.35          |
| 2-A     | $\frac{3}{4}$ , $1\frac{1}{8}$ , $1\frac{1}{2}$  | $\frac{1}{2}$ , $\frac{3}{4}$ , $1$           | 16" to 18"              | 35.15          |
| 3-A     | $\frac{3}{4}$ , $1\frac{1}{8}$ , $1\frac{1}{2}$  | $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$ | 20" to 22"              | 61.55          |
| 4-A     | $1\frac{1}{8}$ , $1\frac{1}{4}$ , $1\frac{3}{8}$ | $\frac{1}{2}$ , $\frac{3}{4}$ , $1$           | 24" to 36"              | 87.95          |
| 6-A     | $1\frac{1}{2}$ , $1\frac{3}{4}$ , $2\frac{1}{2}$ | $\frac{1}{2}$ , $\frac{3}{4}$ , $1$           | 24" to 36"              | 193.50         |

\*  $\frac{3}{8}$ " diameter bar included in set is solid tool steel.

### INDIVIDUAL BARS (Calibrated)

| Bar No. | Dia.            | Length | Tool Bit      | Price  | Bar No. | Dia.             | Length | Tool Bit      | Price  |
|---------|-----------------|--------|---------------|--------|---------|------------------|--------|---------------|--------|
| 162A    | $\frac{3}{8}$ " | 7"     | $\frac{1}{8}$ | \$3.50 | 127A    | 1"               | 14"    | $\frac{1}{4}$ | \$6.30 |
| 122A    | $\frac{1}{4}$ " | 8"     | $\frac{1}{8}$ | 3.50   | 128A    | $1\frac{1}{8}$ " | 16"    | $\frac{3}{8}$ | 8.75   |
| 123A    | $\frac{1}{4}$ " | 9"     | $\frac{1}{8}$ | 3.50   | 129A    | $1\frac{1}{8}$ " | 18"    | $\frac{3}{8}$ | 12.30  |
| 124A    | $\frac{3}{8}$ " | 10"    | $\frac{1}{8}$ | 3.50   | 130A    | $1\frac{1}{2}$ " | 23"    | $\frac{1}{2}$ | 16.30  |
| 125A    | $\frac{3}{8}$ " | 11"    | $\frac{1}{8}$ | 4.35   | 176A    | $1\frac{7}{8}$ " | 30"    | $\frac{5}{8}$ | 36.35  |
| 126A    | $\frac{1}{2}$ " | 13"    | $\frac{1}{8}$ | 6.30   | 155A    | $2\frac{1}{2}$ " | 36"    | $\frac{3}{4}$ | 72.70  |

### CALIBRATED CHATTER-PROOF BORING BARS

- ★ Graduated in quarter inch calibrations to speed production.
- ★ Made from special tough non-chattering steel.
- ★ Tool bit hole broached in each end—one at 90°, other at 45°. ( $1\frac{7}{8}$ " and  $2\frac{1}{2}$ " Bars have one hole at 90° and other at 30°.)

When ordering give make and swing of lathe.

### IMMEDIATE DELIVERY

Write for information on GLOBE Grinders—Buffers—Millers—Hand Screw Machines—Turrets—Cross Slides—Etc.

DISTRIBUTED BY BETTER DEALERS EVERYWHERE

### HIGH SPEED CUTTER BITS—PRICE EACH

|                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                        |                        |                        |                                  |                                  |                                  |                        |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|
| $\frac{1}{8} \times \frac{1}{8}$ | $\frac{1}{8} \times \frac{1}{2}$ | $\frac{1}{8} \times \frac{1}{4}$ | $\frac{1}{8} \times \frac{1}{4}$ | $\frac{1}{8} \times \frac{1}{2}$ | $\frac{1}{4} \times \frac{1}{4}$ | $\frac{1}{4} \times \frac{1}{2}$ | $\frac{1}{8} \times \frac{1}{4}$ | $\frac{1}{8} \times \frac{1}{2}$ | $\frac{3}{8} \times \frac{1}{2}$ | $\frac{3}{8} \times 3$ | $\frac{1}{2} \times 2$ | $\frac{1}{2} \times 4$ | $\frac{5}{8} \times \frac{1}{4}$ | $\frac{5}{8} \times \frac{1}{2}$ | $\frac{5}{8} \times \frac{1}{2}$ | $\frac{3}{4} \times 5$ |
| .20                              | .30                              | .20                              | .25                              | .30                              | .25                              | .35                              | .30                              | .45                              | .40                              | .75                    | .85                    | 1.35                   | 1.25                             | 2.25                             | 2.15                             | 3.10                   |

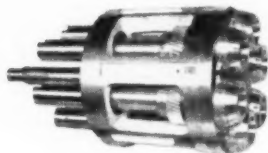
## GLOBE PRODUCTS MANUFACTURING CO.

3380 Robertson Blvd., Los Angeles 34, California, U. S. A.

# MAINTENANCE BEGINS WITH DESIGN

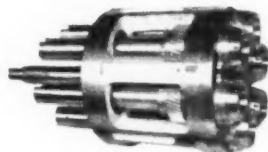
Buyers look for the "hidden dollars saved" in good Machine Design. They know it pays to see beyond a purchase price that might turn out to be a mere down-payment. Upkeep and replacements can be very costly. Builders of multiple spindle automatics know the

importance of a well-designed work spindle carrier. It has been referred to as the "heart" of accuracy. If you are an automatic user, you can quickly check on the maintenance dollars to be saved through the design of the Conomatic Carrier.



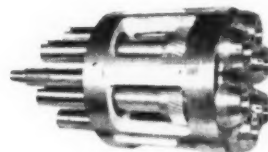
**INTEGRAL  
DRUM TYPE**

Heavily ribbed, integral, drum shaped design, for adequate resistance to torsion strain under the heaviest of loads.



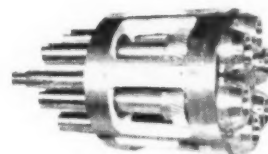
**GREATER  
LENGTH**

Greater length, for better alignment of work and for greater bearing area of work spindles. Driven gears in balanced position for better distribution of load on spindles and bearings.



**TAPERED  
FRONT BEARING**

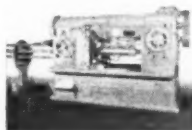
Exclusive tapered front bearing for the only combination radial and end thrust take-up facility provided by any multiple spindle automatic carrier. It is an important safeguard against deflection.



**FREE OF  
CROSS SLIDE PRESSURE**

Rugged support of work, and relief from cross slide pressure by the block measurement positive stop provision against the machine frame, insure the maintenance of form tool and endworking tool operations to closer limits and quality finish.

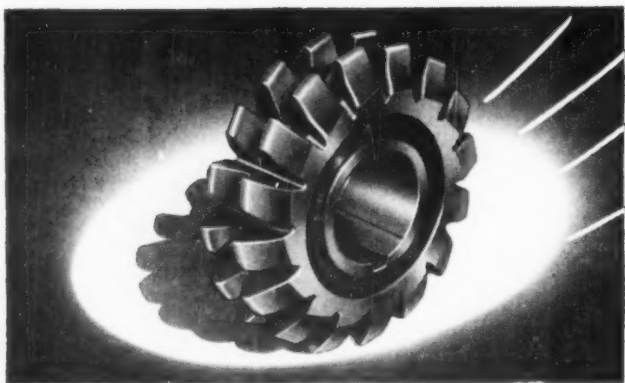
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A comparison with ALL Automatics  
will lead you to

## Conomatic

CONE AUTOMATIC  
MACHINE COMPANY, INC.  
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# *Reduce Tooling Costs Increase Production*

## WITH **SENTRY** HARDENING

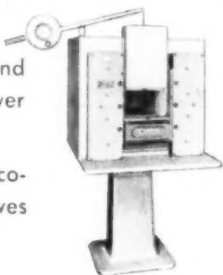
Full hardness and maximum toughness result when your high speed steel tools are hardened in Sentry Electric Furnaces using Sentry Diamond Blocks. Unusual contours and sharp corners are faithfully retained.

With Sentry Diamond Blocks a neutral atmosphere is maintained — no oxidation, no scaling, no reduction in size. Tools may be thoroughly soaked for maximum hardness without danger of burning. High resistance to breakage and longer tool life result in higher production and lower tooling costs.

Sentry Furnaces are fast, clean and economical to operate. They pay for themselves within a short time.



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Sentry Model 5Y  
Electric Furnace

# **The Sentry Company**

FOXBORO, MASS., U.S.A.



**MEET SOARING PRODUCTION COSTS**

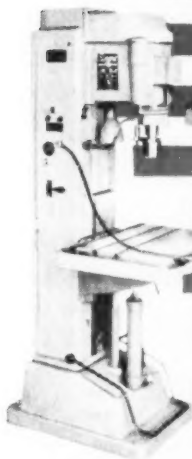
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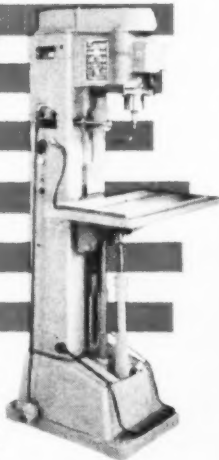
**AIR-OPERATED  
ELECTRICALLY CONTROLLED  
DRILLING, TAPPING AND THREADING  
MACHINES**

•Snow Full Universal Air Operated Electrically Controlled Tapping Machines. 4 sizes cover a range from  $\pm 0$  to  $\frac{1}{4}$ " in mild steel.



•Snow Full Universal Air Operated Electrically Controlled Threading Machines. 2 sizes cover a range from  $\pm 3$  to  $1\frac{1}{2}$ " in mild steel.

•Snow Full Universal Air Operated Electrically Controlled Drilling Machines. 2 sizes cover a range from  $\pm 60$  to  $\frac{1}{4}$ " in mild steel.



•Today's severe competition will be worse tomorrow. It cannot be met with yesterday's machine tools. The new Snow Full Universal Air-operated, Electrically Controlled Drillers, Tappers and Threaders are the answer for maximum production of small parts. •Typical of advanced design and amazing performance is the Snow Full Universal Drilling Machine (bottom left). Drill sets its own rate of feed for increased output and greater tool economy. In thousands of installations it has demonstrated capacities of 6000 pieces per hour. Numerous types of Snow air-operated indexing and clamping fixtures and jigs are available for instant synchronizing to the machines. Our engineers will gladly study your parts and blue prints and submit highly profitable suggestions. Send for data on all these Snow machines.

**Snow**

HIGH PRODUCTION DRILLING, TAPPING,  
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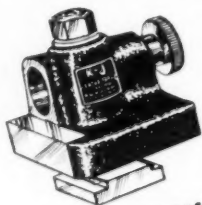


**20% TO 200% MORE OUTPUT**

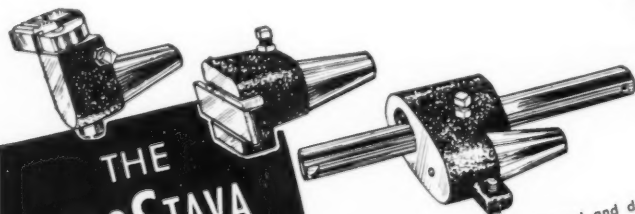
*with* **K-J** **Quick Change LATHE TOOLING**

The time saving and simplifying of operations is unbelievable until actually experienced. Change from drilling to boring, to threading, turning, facing, cutoff and all other operations takes but three or four seconds and affords a permanent, ready made set-up for all standard engine lathe operations. No wrenches needed for operation changes. Rigid and vibration free, they insure closer accuracy and greatly prolong tool life. Designed to use cemented carbide tipped tool bits.

Send for detailed information. Try K-J Quick Change Lathe Tooling on any engine lathe and you will find that it really costs money to be without it, regardless of number of pieces per job.



**TOOL HOLDER BASE**  
Holds tools for all operations, enabling instant, precision changes without wrenches.



Boring tools are rigidly supported and designed to eliminate excess overhang. Instantly changed from any other engine lathe operation.

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Quick change tools available for straight turning, cutoff, side-forming, end-forming, threading or turning, drilling, boring, thread chasing, knurling, box turning, cutting of practically any type.



**FROM**

**25-125**

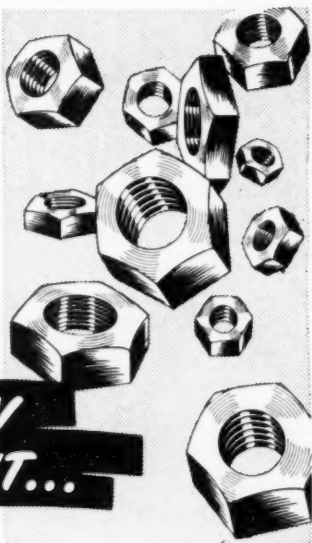
**erratic threaded holes  
per tap**

**TO**

**22,000**

**clean class 3 threaded  
holes per tap**

**HERE'S HOW  
HY-PRO DID IT...**



**PART:** 18-8 stainless steel hex nut with *punched hole*

**PROBLEM:** Tapping with a 10-24 tap, a leading nut manufacturer experienced difficulty holding size and was troubled with excessive tap breakage.  
*Then They Called in the HY-PRO Sales Engineer*

**HY-PRO SOLUTION:** His recommendation was a standard Hy-Pro 10-24 machine screw tap with one of the exclusive Hy-Pro surface treatments for wear and lubrication. Speed and cutting oil were adopted from extensive tables in Hy-Pro catalog. Production with Hy-Pro taps now averages 22,000 burr-free *Class 3* threaded holes at 62 nuts per minute.

Above is a typical example of how the Hy-Pro Sales Engineer can help increase threaded-hole production. His expert engineering counsel backed by the most up-to-date tap production methods combine to solve tapping problems rapidly and profitably.

**Rx**

Let Hy-Pro solve your tapping problem —  
call a Hy-Pro Sales Engineer today.

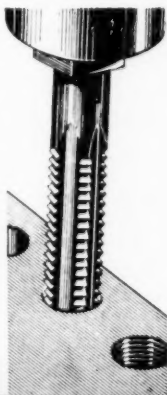
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**HY-PRO  
TAPS**

**HY-PRO TOOL CO.**

**NEW BEDFORD, MASSACHUSETTS**

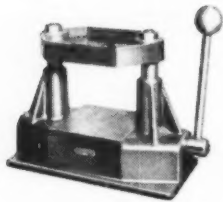
**A SUBSIDIARY OF CONTINENTAL SCREW COMPANY**



# N.A. WOODWORTH

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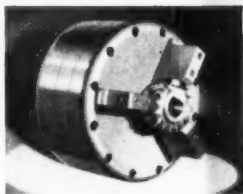
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Chucks engineered and built by Woodworth guarantees the ultimate in precision gear chucking.

Woodworth Cone-Lok Jigs are noted for their mechanical simplicity and "life-time" construction.



**DIAPHRAGM CHUCKS**



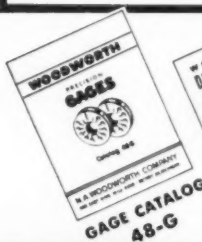
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New, comprehensive catalogs on N. A. Woodworth chucks, jigs and gages. Precision parts data supplied upon request for specific information. All inquiries should be on your company letterhead and mailed to address below.

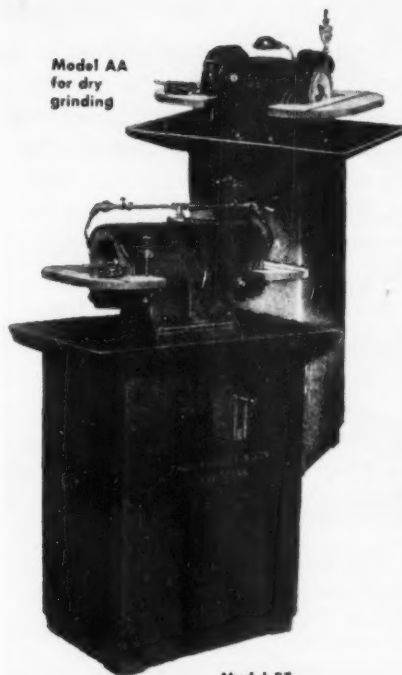
# WOODWORTH

N. A. WOODWORTH CO., 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN

PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS • PRECISION PARTS

# GRIND TOOLS TO EXACT ANGLE ..FASTER

Model AA  
for dry  
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for grinding  
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YOU GET the grinding angle you want instantly with the famous indexing feature of these Prosser high-speed grinders. The quick-acting tables need never be raised or lowered—and once set, they stay put.

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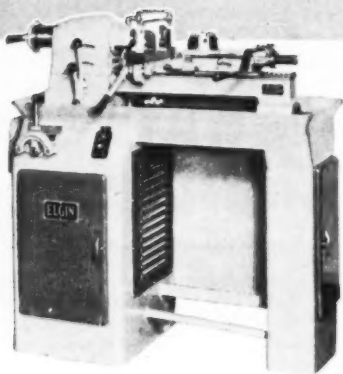
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**ON SMALL DIAMETER PRECISION PARTS**

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**Faster: More Accurately**



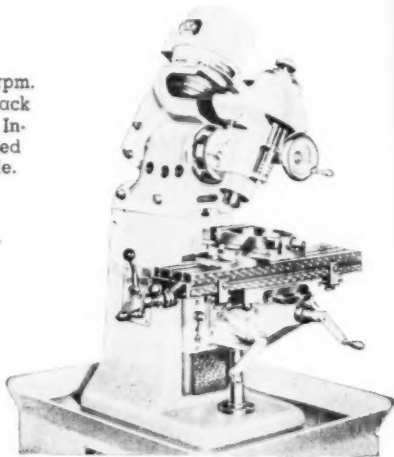
**Elgin Knee Hole Type Hand  
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9" swing, 1" collet capacity. Collet rack  
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*are setting new cutting records especially on horizontal band saw machines everywhere!*

Users tell us . . . these Wavy Set blades are cutting better than 30% more metal . . . 50% more they say, on stainless steel . . . than any standard raker set blade. And cutting at closer tolerances! Why? Just three major reasons tell the story . . .

**FIRST** . . . the teeth are set into the back of the saw, which means added strength . . . and practically no tooth rippage.

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**THIRD** . . . made by saw specialists . . . the originators of the WAVY SET BLADE . . . who have incorporated new principles in basic design and heat treatment.

Order from your Mill Supply Distributor. He is always ready to serve your needs for all industrial supplies, including MILFORD hack saw and band saw blades.

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Individually packed in cartons for easy handling.

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PROFILE AND  
BAND SAW BLADES  
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HACK SAW BLADES

### THE HENRY G. THOMPSON & SON CO.

**Saw Specialists Exclusively for over 70 Years**  
NEW HAVEN 5, CONNECTICUT, U. S. A.



First in a series of  
Unusual Grinding  
Wheel Operations



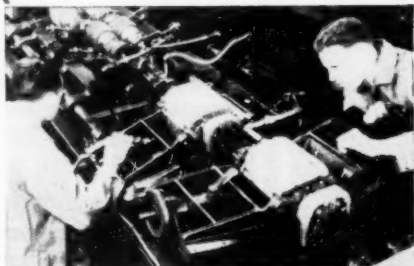
**Giving the  
RAZOR BLADE  
a close shave!**

● "Look Sharp — Feel Sharp — Be Sharp" . . .

This world famous slogan has a definite relationship with the exacting requirements that the Gillette Safety Razor Co. place upon BAY STATE grinding wheels. Just imagine the precision limits that require a scientifically directed beam of light to measure the keenness of a cutting edge!

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Send us your grinding problems. We can help you.



Photograph, Courtesy of Gillette Safety Razor Company.

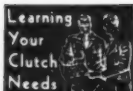
**BAY STATE ABRASIVE PRODUCTS CO.  
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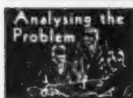


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Installation



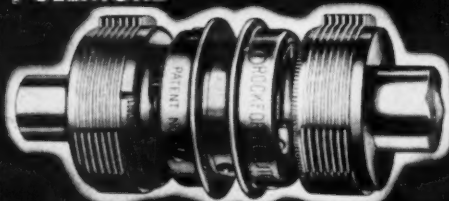
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**Better CLUTCH Design  
Benefits PRODUCT Design**

**PULLMORE**



**MULTIPLE-DISC**

**ROCKFORD**

**CLUTCHES**

Fitting the clutch to the product — instead of the product to the clutch — requires that the clutch be designed, manufactured and applied to meet the product's specific needs. Before you approve the design for your next model — double check to see if it includes all the improvements you can give it — with the *right* ROCKFORD CLUTCH application. You are invited to utilize the clutch "know-how" of our engineers to give your design the technical clutch advancements that will provide your product with important competitive advantages.

**ROCKFORD CLUTCH DIVISION**

BORG-WARNER

300 Catherine Street, Rockford, Illinois



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Farm Machines  
and Implements



Oil Field  
Rigs and Pumps



Industrial



Mowers  
and Light  
Machines



Engines and  
Marine  
Units



Machine Tools  
Production Units

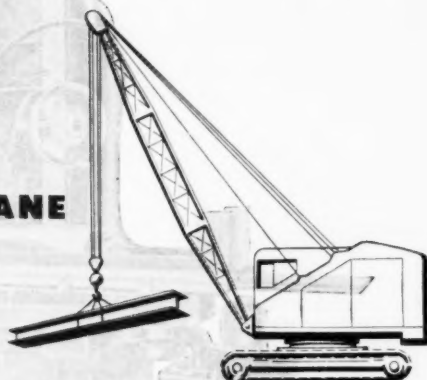


ROCKFORD  
CLUTCHES  
POWER  
TAKE OFFS

**A GAUGE**




**A CRANE**



**NO SPINDLE PLAY**

## **AND GRAND RAPIDS' MICRO-ACCURACY**

 A precision gauge can be only as accurate as the grinding machine used to finish-grind it. The sub-assemblies of a giant crane present an entirely different grinding problem. Whether in removing a few ten thousandths of metal in a high-accuracy operation, or in removing a lot of metal with greater allowable tolerances, freedom from spindle play is extremely important. That's just one of the reasons why you find Grand Rapids Grinders in so many leading plants of all types — from manufacturers of precision gauges to makers of huge cranes.

Other assurances of long-life accuracy and speed are: the fastest longitudinal table speed (125 f.p.m.) available in any grinder; vibrationless rigidity achieved by massive one-piece column and base casting; patented vertical head adjustment; Bijur one-shot lubricating system.

\*Accuracy within 0.00025 limits.

**To serve you —** Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Tap Grinders, Drill Grinders, and Combination Tap and Drill Grinders.



**GRAND RAPIDS GRINDERS**

405 STRAIGHT AVE., S.W., GRAND RAPIDS 4, MICHIGAN

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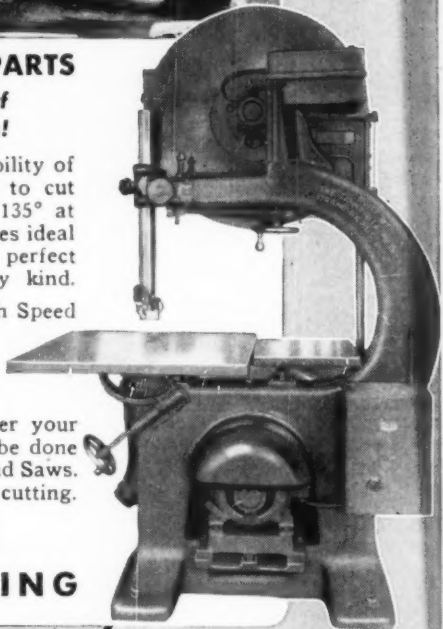
# *The SUPER METHOD*



## **of TRIMMING FORMED PARTS and performing a host of other metal cutting jobs!**

The negligible down-drag and the ability of Tannewitz High Speed Band Saws to cut sheet metal from 90° to near 0 or 135° at tremendous speed make these machines ideal for trimming. Cuts can be made with perfect safety without using a rest of any kind.

Friction sawing with Tannewitz High Speed Band Saws also results in perfectly amazing time savings in the cutting of flat sheets, soft or hardened steels, armor plate, plastics, glass and many other materials. Whatever your cutting problem, chances are it can be done better and faster with Tannewitz Band Saws. Investigate this "Super" method of cutting.



Write for Your  
Free Copy

## **FRICTION SAWING**

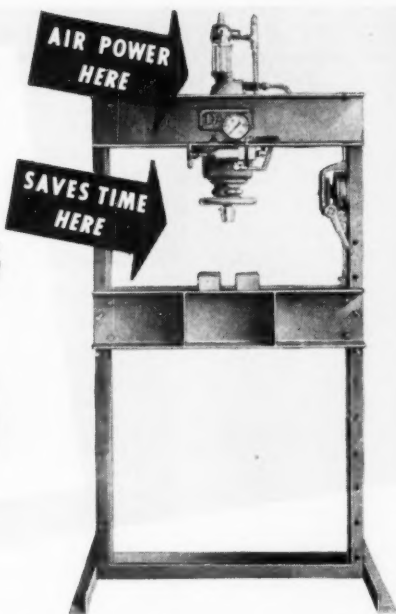
# *with* **Tannewitz**

## **HIGH SPEED BAND SAWS**

# **THE TANNEWITZ WORKS**

## **GRAND RAPIDS 4, MICHIGAN**

*Cut  
Press Time  
to 1/3*



## **LOW-COST AIR-OPERATED PRESS** **FOR *Faster Production***

If you have been using up valuable man-hours with a hand-pumped press, eliminate this waste right now. Here's a speedy air-operated press that really saves production time. Actual tests show that in many instances it cuts  $\frac{2}{3}$  of the time needed for a press op-

eration. Pressures up to 75 tons are provided by a compressed-air pump at a speed that puts a big dent in production costs.

For further information about this or any other Dake press, mail the coupon for your free copy of the Dake press catalog.



Dake Engine Company  
608 Seventh St., Grand Haven, Mich.

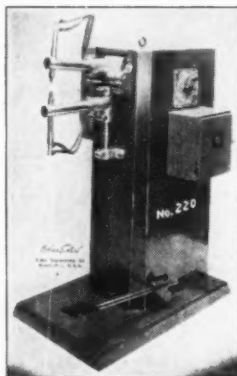
Please mail me a copy of the latest Dake Arbor Press Catalog.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
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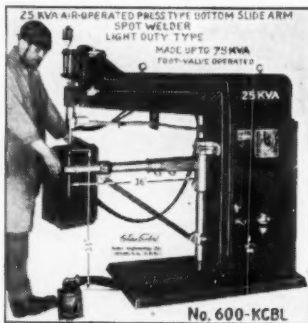
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# SPOT BUTT GUN ARC WELDERS

WE MANUFACTURE A COMPLETE LINE OF  
**RESISTANCE SPOT WELDERS**  
FOR ALL TYPES OF WELDING IN SIZES: 1/4 to 300 KVA.  
WELDING TIPS, HOLDERS AND HORNS.  
ASK FOR EISLER'S TIP AND WELDER CATALOG



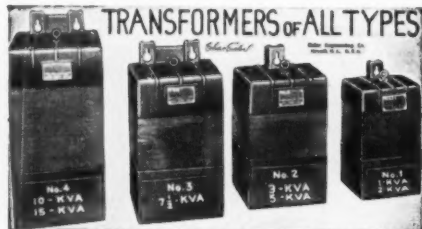
WE INVITE CONTRACT SPOT OR  
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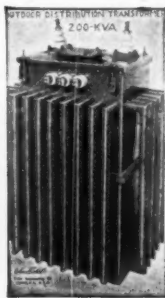
WE MAKE ALL TYPES OF **TRANSFORMERS**

SIZES FROM 1/4 TO 300 KVA

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Water Cooled, Reactors and Special Trans-  
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100 TO 400 AMPS.



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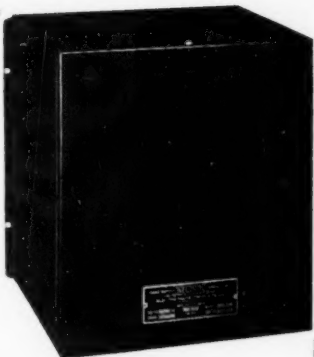
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FOOT, AIR  
OR MOTOR OPERATED

**CHAS. EISLER**  
**EISLER ENGINEERING COMPANY, INC.**  
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Magnetic  
Chuck  
Controls

## WHEREVER MAGNETIC CHUCKS ARE USED



THE ELECTRO-MATIC RECTIFIER AND NEUTROL MAGNETIC CHUCK CONTROL ARE INDISPENSABLE FOR BETTER AND SAFER GRINDER PERFORMANCE

NEUTROL Magnetic Chuck Controls speedily release and demagnetize workpieces. With NEUTROL, there's no need to hammer or pry to release the work. This saves time and tempers—saves marred, distorted workpieces and prevents damaging of chuck faces. NEUTROL also protects chucks against harmful voltage surges.

ELECTRO-MATIC Rectifiers are sturdy, heavy duty, direct current supply units, engineered to "stand up" day-after-day in the hardest service. They are available in any desired voltage combination in capacities ranging from 100 to 20,000 watts.

NEUTROL and ELECTRO-MATIC Rectifiers can be installed easily on equipment already in use—or built into new machines before delivery if you so specify.

*Let us send bulletins giving full information—no obligation.*

**ELECTRO-MATIC PRODUCTS CO.**  
2235 North Knox Ave., Chicago 39, Illinois



**ELECTRO-MATIC**  
Industrial  
Rectifiers

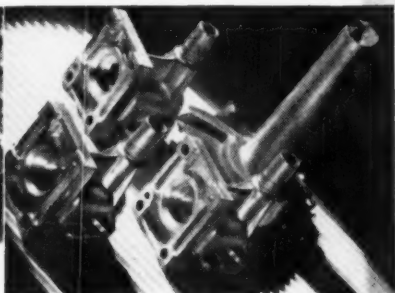


**If you're considering new die casting machinery...**

**why not profit from the  
experience of others?**



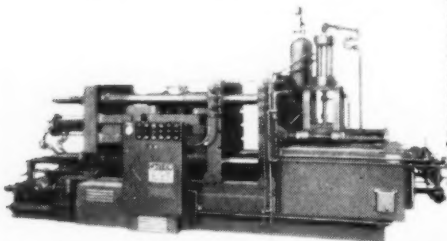
One of a battery of 5 Model 400 Cleverlands in operation in the modern plant of the St. Louis Die Casting Corp., St. Louis, Mo. The operator is removing the casting shown at right.



**ST. LOUIS DIE CASTING CORP.  
gets better castings,  
faster, at less cost  
WITH CLEVELAND MODEL 400's**

These three examples are typical of the production—around the clock—that experienced die casters are getting from Cleveland Die Casting Machines. You too can get better castings, faster, at less cost, with Cleverlands.

Let a Cleveland engineer show you *further proof* of the advantages these machines can bring to your die casting production. For complete information on machine specifications, write now for bulletins.



**340 SHOTS PER HOUR!**

Weight of metal per shot 14.35 oz. Weight per piece 4.6 oz.

Zinc fan gear case casting from two-cavity die with movable cores. Most of the cored holes required no further finishing. Three critical dimensions are held to  $\pm .001$ " tolerance. Each casting receives a careful spot check, and at time photo was taken, 170,000 castings had been produced without a single reject.



**325 SHOTS PER HOUR!**

Weight of metal per shot 3.3 lbs. Weight per piece 4.75 oz. Zinc nuts cast from 8-cavity die.



**375 SHOTS PER HOUR!**

Weight of metal per shot 1.15 lbs. Weight per piece 1.8 oz. Zinc nobs for electric control panel cast from 6-cavity die.

Cleveland Model 400 Universal High-Pressure Hydraulic Die Casting Machine for zinc, tin or lead. Hot metal end can be easily changed to convert to cold chamber machine. 36" x 38" die plates. Approx. 800,000 lbs. locking pressure.

**THE CLEVELAND AUTOMATIC MACHINE COMPANY**

**4934 Beech Street  
Cincinnati 12, Ohio**

SALES OFFICES: CHICAGO  
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Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

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*Standardized  
for*

1. LOWER COSTS
2. QUICKER DELIVERY
3. SUPERIOR

*Performance*

ALMOST without exception, the hydraulic cylinder you need to fit even your special applications can be found as a standard unit listed in the big 52 page Hannifin catalog. This is your key to LOWER COSTS . . . QUICKER DELIVERY . . . SUPERIOR PERFORMANCE. The Hannifin line is complete! All standard and combination mounting styles . . . bore diameters, 1" to 8" . . . any length stroke . . . standard, double end, or heavy duty (2:1) piston rods . . . with or without cushions.



Model JN

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Save time and money. Use this 52 page bulletin as a guide for meeting all of your hydraulic cylinder requirements out of a standard line. Ask for Bulletin 110-Z



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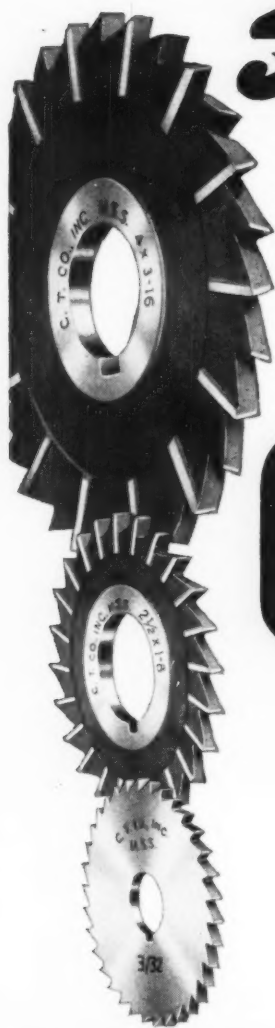
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*Nationwide  
Sales and  
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AIR CYLINDERS • HYDRAULIC CYLINDERS • HYDRAULIC PRESSES  
PNEUMATIC PRESSES • HYDRAULIC RIVETERS • AIR CONTROL VALVES



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**CIRCLE®**

**METAL SLITTING SAWS!**

**Staggered Teeth with Side Chip Clearance.** Diameters from 3" x 3/16" to 8" x 1/4".

**Side Chip Clearance.** Diameters from 2 1/2" x 1/16" to 8" x 3/16".

**Hollow Ground.** Diameters from 1 1/4" x 1/32" to 10" x 3/16".

Eliminate binding and dragging...take deeper cuts.

There's a **CIRCLE®** Metal Slitting Saw for every job!

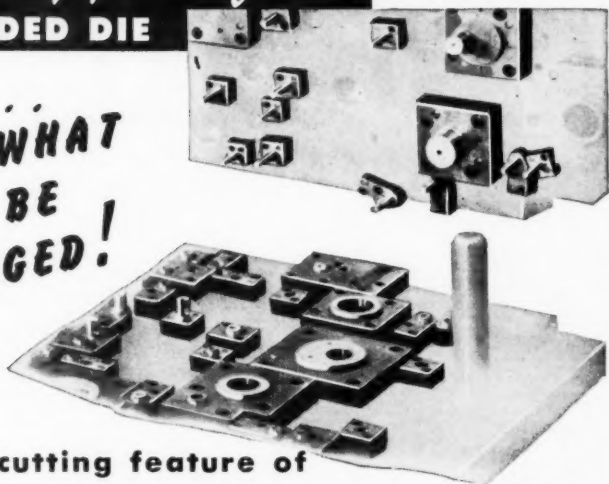
**CIRCULAR TOOL CO., INC.**

**PROVIDENCE 5, RHODE ISLAND**

CHICAGO • PHILADELPHIA • NEW YORK • DAYTON • CLEVELAND • ROCHESTER  
LOS ANGELES • DETROIT • ST. LOUIS • MINNEAPOLIS

*It's only part of a*  
**DISCARDED DIE**

*but . . .*  
**LOOK WHAT  
CAN BE  
SALVAGED!**



**. . . a cost-cutting feature of  
R-B Interchangeable Punches and Dies**

Because R-B interchangeable punches, dies and their retainers are standardized . . . completely uniform and interchangeable . . . they can be used over and over as die requirements change. Retainers are quickly and easily re-located and mounted on new die shoes. Punches and dies, when worn, can be reground into new sizes and shapes. While this saving is important, don't forget that, besides saving time and money in die-making, R-B punches and dies also save money in reduced press "down-time" for punch and die replacement because they are completely and quickly interchangeable.

Immediate delivery on R-B punches and dies of standard sizes, shapes and materials. Special punches and dies made promptly to your specifications.

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A 48-page book containing full information on Allied's "one stop service." Write for your copy.



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# LOCALITE

## FOR GREATER EFFICIENCY



*Increase Worker  
Productivity*

# LIGHT

WHERE LIGHT  
IS NEEDED MOST

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For folder on "How to  
Plan Your Lighting" and  
complete catalog of Local-  
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**- ON THE VITAL  
SEEING ZONE**

The better a worker can see what he is doing—the faster and more accurate is his production—and the lower are your costs. Good light, under his control, is his most vital tool. That's why Localites are *first* for seeing on any precision job. With a Localite the worker controls the quantity and direction of light *exactly* as he needs it to see most efficiently his particular task. Thousands of industrial concerns are now profiting with this most efficient lighting method. Check your plant lighting, today. There is a Fostoria Localite designed for every seeing need.



**THE FOSTORIA  
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*Fostoria Lighting Equipment Is  
Available Through Selected  
Wholesalers from Coast to Coast*



**MODEL 3267-C-172**

Used for machine tools, assembly, inspection, and instrument repair work. Overall length 32 3/4". Three joint adjustable. Circular base for 3-screw mounting. In excess of 200 footcandles.

**\$589 COMPLETE**

(Net Industrial Price)



**MODEL 32-H-174**

Recommended for small machine tools, lathes, punch presses, etc. Overall length 23 1/4". Two joint adjustable. Flat oblong base for screw mounting. In excess of 175 footcandles.

**\$431 COMPLETE**

(Net Industrial Price)



**MODEL 3470-P-172**

Used for large presses, milling and boring machines. Also assembly and inspection benches. Overall length 45 1/2". Three joint adjustable. Circular base for 3-screw mounting. In excess of 200 footcandles.

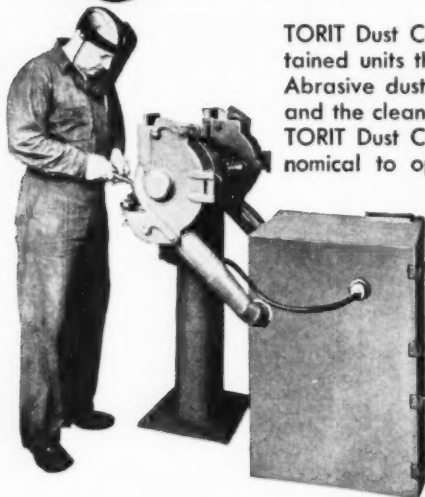
**\$611 COMPLETE**

(Net Industrial Price)



Abrasive dusts irritate workmen and slow production. Eliminate them with

## **TORIT DUST COLLECTORS**



TORIT Dust Collectors are completely self-contained units that are attached at the machine. Abrasive dusts pass through spark-proof filters and the cleaned air is recirculated.

TORIT Dust Collectors are easy to install, economical to operate, and may be moved as production layouts are changed. Sizes ranging from  $\frac{1}{3}$  HP to 3 HP, and fitting all standard grinding, cut-off and polishing wheels are available for immediate delivery. For details and latest TORIT catalog write:

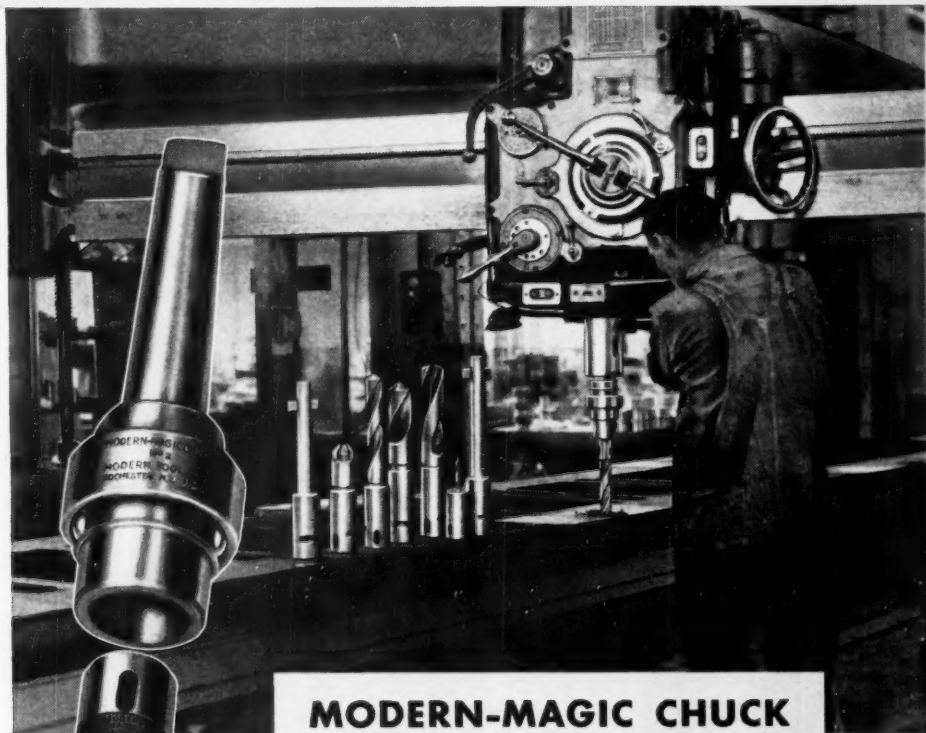
**TORIT**  
**MANUFACTURING CO.**

303 WALNUT ST. • ST. PAUL 2, MINN.



**KEEP YOUR MACHINES RUNNING...**

**DON'T STOP SPINDLES TO CHANGE TOOLS**



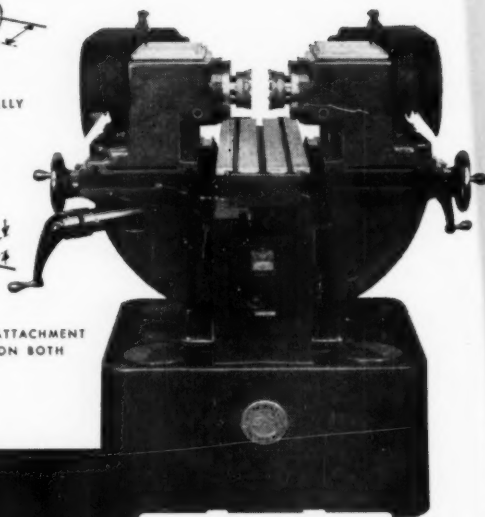
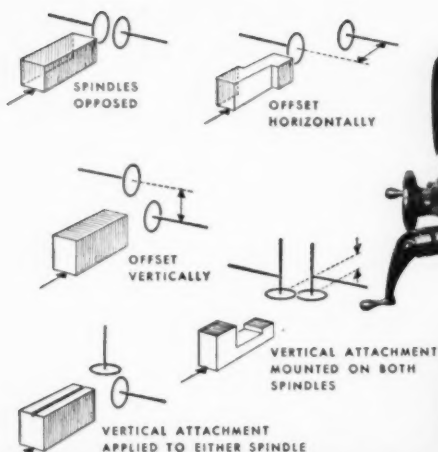
**MODERN-MAGIC CHUCK  
AND COLLET EQUIPMENT**

Increase your production through elimination of spindle stoppage for tool change. With Modern-Magic Chuck and Collet equipment, tools are quickly and easily changed as the spindle revolves at operating speed. Simple, advanced design makes Modern-Magic Chucks and Collets practically trouble-free. Sturdy, fool-proof construction insures longer accurate service. Your copy of Bulletin M-103 giving full information will be sent upon request. Today?

Only the ORIGINAL Modern-Magic Chuck and Collet Equipment carry the name "MODERN-MAGIC" and are manufactured by Modern Tool Works, Rochester, N. Y.

**MODERN TOOL WORKS**

DIVISION OF  
CONSOLIDATED MACHINE TOOL CORPORATION  
ROCHESTER 10, NEW YORK



## THE *Nichols* TWIN MILLER

... a money-maker on jobs like this



- 1 Milling 4 screw recesses in X-1315 split lineshaft pinion. Two  $\frac{3}{8}$ " end mills used at 1600 R.P.M. 70 blanks per hr.
- 2 Sawing two  $\frac{1}{8}$ " slots, 2 blanks at a time, at 270 R.P.M. 196 blanks per hr.



Also available are Nichols Two Spindle Hand Millers with identical or opposed spindles and with or without pneumatic feed.



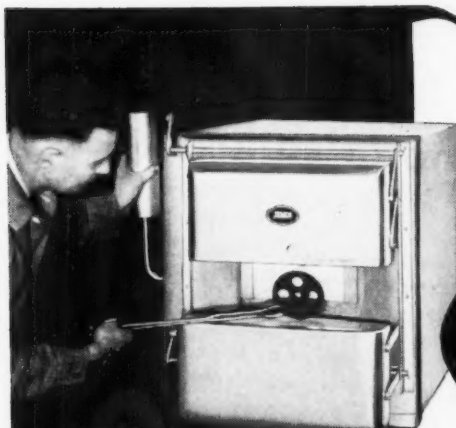
For operations such as those diagrammed at the left, the Nichols Twin Miller offers exceptional economy with greatly increased output. Its rugged, precise construction combined with ample power is ideal for machining simultaneously two surfaces which must be held in accurate relation. The preloaded ball bearing spindles may be positioned horizontally, vertically, and crosswise, independently of each other. A solenoid operated air cylinder feeds the table automatically. Fifteen spindle speeds between 55 and 2080 rpm are available. Condensed specifications are listed below. For full details write Nichols-Morris today.

### CONDENSED SPECIFICATIONS

|  |                             |
|--|-----------------------------|
| Table, working surface.....                                | 8 1/2" x 30"                |
| Table travel — cutting stroke.....                         | 12"                         |
| Motors.....  | 1725 RPM AC reversible 1 HP |
| Maximum height center of spindle above table.....          | 12"                         |
| Maximum offset of spindles (horizontal).....               | 9"                          |
| Maximum distance between spindle noses (across table)..... | 16"                         |
| Overall Dimensions.....                                    | 4' x 5' x 47"               |

MANUFACTURED BY  
W. H. NICHOLS COMPANY, WALTHAM, MASS.  
NATIONAL DISTRIBUTORS NICHOLS-MORRIS CORP., 50-G CHURCH ST., NEW YORK 7, N.Y.





**SERIES 1700**—Two models; with chamber sizes  $8\frac{1}{2}$ " W,  $7\frac{1}{2}$ " H,  $13\frac{1}{2}$ " D or  $8\frac{1}{2}$ " W,  $7\frac{1}{2}$ " H, 18" D. Both for 230-volt operation. Prices—\$250.00 to \$405.00 complete with controls.



#### **SERIES 1600**

—Two models; with chamber sizes 5" W,  $4\frac{1}{2}$ " H, 9" D and 5" W,  $4\frac{1}{2}$ " H,  $13\frac{1}{2}$ " D. 115 or 230-volt operation. Prices—\$140.00 to \$280.00 complete with controls.



#### **SERIES 1500**

—Two models; with chamber sizes 4" W,  $3\frac{1}{2}$ " H,  $4\frac{1}{2}$ " D and 4" W,  $3\frac{1}{2}$ " H, 9" D. 115 or 230-volt operation. Prices—\$87.50 to \$107.50 complete with stepless control.

*New Improved*

**TEMCO**

### **ELECTRIC FURNACES**

**FOR HEAT TREATING TOOLS, DIES, PARTS  
AND GENERAL LABORATORY WORK**

Do your own heat treating... right in your own plant or shop... save time and costs, eliminate sending work "outside". Investigate this rugged *entirely new* TEMCO line today... welded steel construction, heavy dual insulation! Fast-heating and can be operated continuously up to  $1650^{\circ}\text{F}$ ., intermittently to  $1900^{\circ}\text{F}$ . Use for hardening and tempering of tools, dies, parts and small unit production. Ideal, too, for lab testing and process control. Write today for data and your nearest dealer's name.

**THERMO ELECTRIC  
MANUFACTURING CO.**

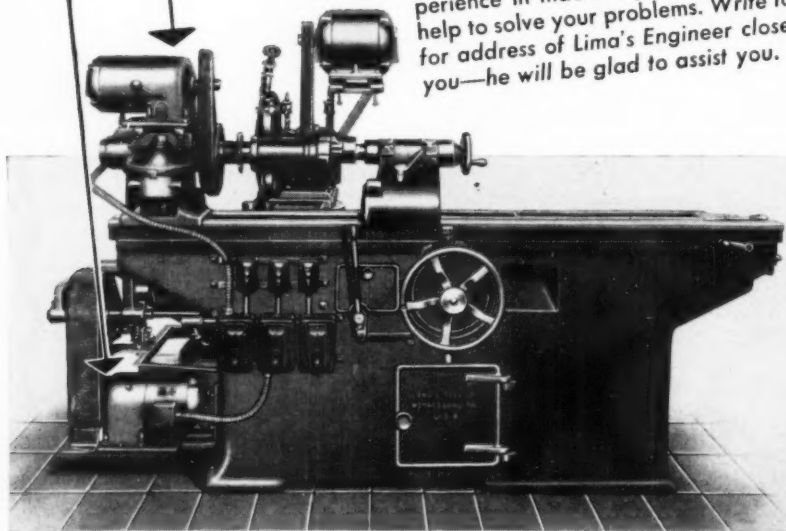
486-3 W. Locust St., Dubuque, Iowa

# LIMA

## meets specific motorization needs

The Landis Universal Grinder illustrated has been equipped with two LIMA "Multi-speed" Gearshift Drives and one LIMA Motor to meet a specific need for both constant and selective driving speeds. This is but one of many motorization problems solved by the combined use of Lima Drives and Lima Motors. Lima units are used extensively on special applications and by Original Equipment Manufacturers as integral driving mechanism of new machinery.

If you have a drive problem, why not consult Lima Engineers; their wide experience in machinery motorization can help to solve your problems. Write today for address of Lima's Engineer closest to you—he will be glad to assist you.



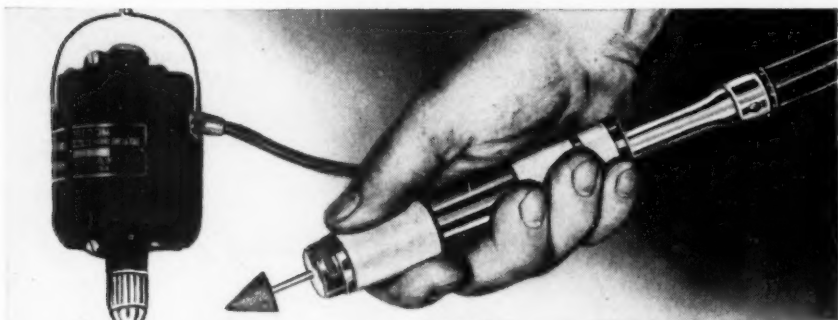
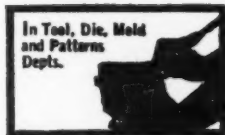
REPRESENTATION IN MOST PRINCIPAL CITIES



**THE LIMA ELECTRIC MOTOR CO.**

294 Findlay Road, Lima, Ohio

LIMA GEARSHIFT DRIVES  
LIMA ELECTRIC MOTORS  
LIMA PEDESTAL GRINDERS



**FOREDOMS are TOPS**  
**"in the small grinder field"**  
**Here are 4 REASONS WHY:**

1. Extra power and longer motor life because motor not dwarfed to fit hand. 2. Correct handpiece size for deft, sensitive, finger-tip control. 3. Complete range of handpieces types. You fit the tool to job at hand. 4. Small handpiece size lets you get into those "hard-to-reach" places.

USE FOREDOMS to grind, polish, drill, rout, mill, saw, slot, clean, sand, etch, engrave, etc. FOREDOMS are profitable additions to all departments — production, maintenance, or tool. The FOREDOM line includes "hang-up" models as illustrated and easily-portable bench models. Foot rheostat is standard with most of them.

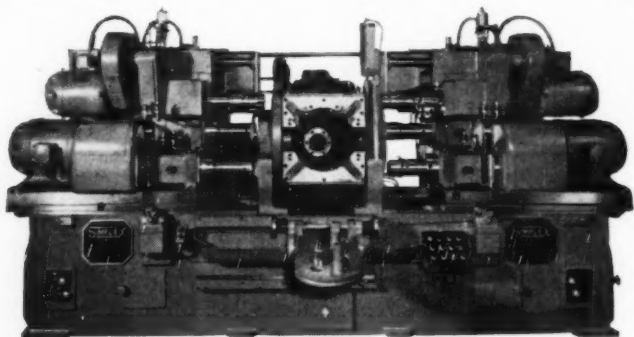
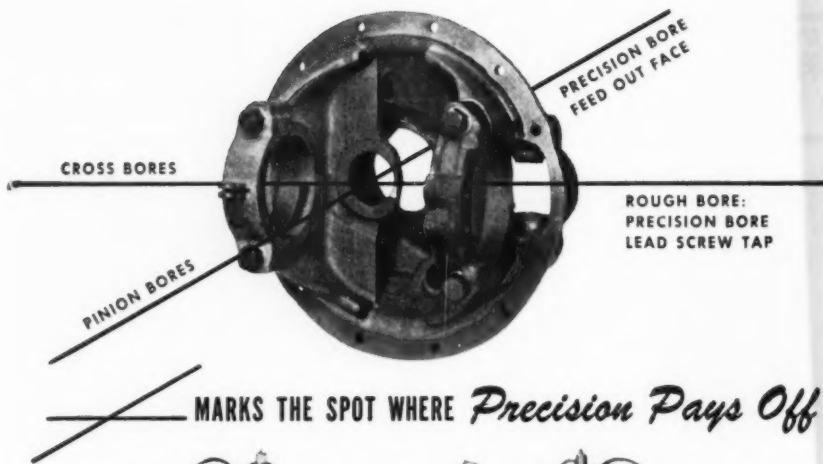
5 quickly interchangeable handpieces types — pencil sizes and larger — some with flexible wrist — see arrow.

Our Catalog N-1915 gives you valuable information as to how you can profitably employ FOREDOMS. It will pay you to send for it.



FOREDOM ELECTRIC CO.,  
 27 Park Place, New York 7, N. Y.  
 Please send us your catalog No. N-1915,  
 showing the different uses of FOREDOM  
 Flexible Shaft Machines.

Name .....  
 Address .....  
 City & Zone ..... State .....



A Prominent Manufacturer of Axles greatly increased production, practically eliminated Axle tear down after assembly and lowered costs with these SIMPLEX 3-way Precision Boring Machines. A four-position indexing fixture permits loading on Station No. 1; Rough Boring Cross Bores on Station No. 2; Precision Boring Cross Bores, Pinion Bore and Feed Out Facing Pinion Bore on Station No. 3; Lead Screw Taping of Cross Bores on Station No. 4. A Production of 40 Carriers per Hour has been achieved on this large Truck type differential Carrier. Smaller Car Carriers would permit considerably higher production rates.

# *Simplex* PRECISION BORING MACHINES

SIMPLEX MACHINE TOOL DIVISION  
STOKERUNIT CORPORATION  
4530 WEST MITCHELL STREET  
MILWAUKEE, WISCONSIN

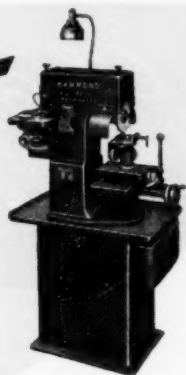
PRECISION BORING MACHINES • PLANER TYPE MILLING MACHINES • SPECIAL MACHINE TOOLS

# Hammond

OF KALAMAZOO

## CARBIDE TOOL AND CHIP BREAKER GRINDERS

*Save*  
TIME  
TOOLS  
WHEELS



CB-77 Chip  
Breaker and  
Diamond  
Finishing  
Grinder



WD-10 Wet  
or Dry 10"  
Carbide  
Tool Grinder



14-WD Wet or Dry 14"  
Carbide Tool Grinder

Hammond Carbide Tool Grinders will soon pay for themselves thru greater wheel economy, longer tool life and **FASTER** grinding. They relieve toolroom bottlenecks and step up production. Write for Carbide Grinder Catalog 220.

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*Machinery Builders*  
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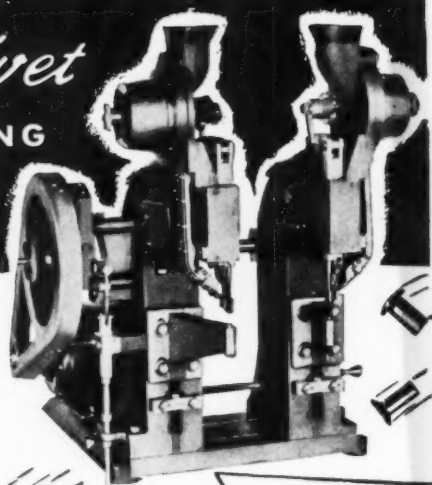


# Chicago Rivet

## AUTOMATIC SETTING

### SLASHES UNIT COSTS!

If your product involves a fastening operation—wood to wood, metal to metal, fabric to fabric, composition to composition, or any combination of these—you can slash unit costs by increasing production volume with high speed Chicago Rivet Automatic Setters and Chicago Rivet tubular or split rivets. Four rivets are automatically fed, inserted and up-set at one release of the foot pedal by the quadruple model Chicago Rivet Setter. Single, double and triple setters are also available.



Bench type  
Double Rivet  
Setter with  
Adjustable  
Riveting  
Centers

#### A Few Applications

AIRPLANE PARTS  
AUTOMOBILE PARTS  
BEAUTY PARLOR  
EQUIPMENT  
BED SPRINGS  
BELTS • BICYCLES  
CAMERAS  
CAN OPENERS  
CANVAS GOODS  
CARD TABLES  
CASH REGISTERS  
CLOCKS  
COFFEE POTS  
DOOR LOCKS  
ELECTRICAL PARTS  
FAN BLADES  
FARM IMPLEMENTS  
FILING EQUIPMENT  
FIREARMS  
FOLDING CHAIRS  
FURNITURE  
GARBAGE CANS  
HARNESS  
INDUSTRIAL BROOMS  
INSTRUMENTS  
IRONING BOARDS  
KNIVES  
LAMPS  
LAWN MOWERS  
LEATHER GOODS  
LOOSELEAF BOOKS  
LUGGAGE  
MILK BOTTLE CRATES  
NOVELTIES  
POTS, PANS & PAIRS  
RULERS  
RADIO PARTS  
REFRIGERATORS  
RUBBER GOODS  
SEWING MACHINES  
SHOES • SKATES  
STEP LADDERS  
STOVES  
TELEPHONES  
TOASTERS • TOYS  
TYPEWRITERS  
VENTILATORS  
WASHING MACHINES

Quick change hoppers, available as extra equipment, enable some models to switch quickly from one size and style rivet to another. Nearly all models clinch grommets, eyelets, staples and Dzus fasteners and insert drive screws — all automatically.

#### FREE FASTENING CLINIC

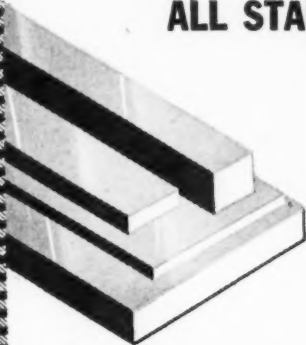
If your product is small, send us an unfastened sample. If it's large, send a sub-assembly. We will gladly analyze your fastening problem, recommend the type rivet and Chicago Rivet Automatic Setter needed and estimate production rates that can be set up on the job.

# Chicago Rivet

CHICAGO RIVET & MACHINE CO.  
9610 W. Jackson Blvd., Bellwood, Ill. (CHICAGO SUBURB)

# Immediate Delivery!!

## ALL STANDARD SIZES FROM STOCK



**LENOX**  
*Precision-Master*  
TRADE MARK  
**GROUND FLAT STOCK**

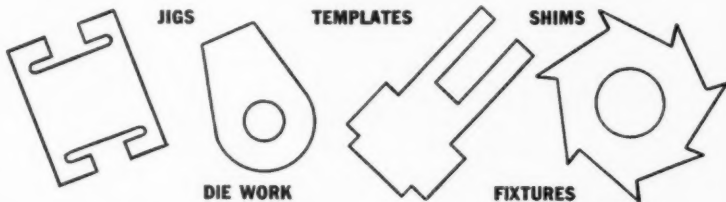
**USAGE** — Saves time and insures accuracy in making **TEMPLATES, JIGS, GAUGES, MACHINE PARTS, SHIMS, FIXTURES, TOOLS, and DIE WORK.** More economical for toolmakers to use as expensive machining and grinding operations necessary to bring mill stock to accurate measurements are eliminated.

**PRECISION GROUND** — Thickness within plus or minus .001" of specification, accurately squared on edges and ends. Smooth Finish.

**STANDARD SIZES** — 18" pieces 1/64" to 1" thickness in various widths. Individually packed in grease proof envelopes. Special sizes on application.

**HEAT TREATMENT** — Instructions on envelope. Can be either Hardened by Oil or Water Method.

**DELIVERY** — Prompt delivery from stock.



**AMERICAN SAW & MFG. CO.**

**SPRINGFIELD 1, MASS.**

# **HELP-STOP**

**POWER-WASTE AND MAINTENANCE COSTS**

## **CONWAY**

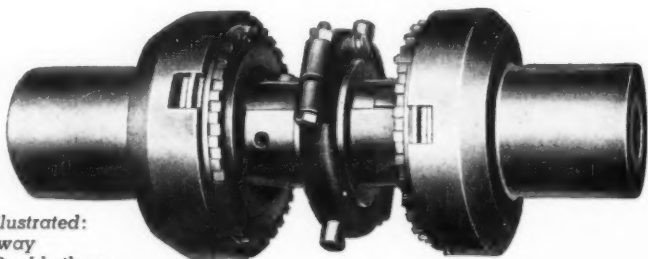
are a "one-way street"  
from power source to  
point of use without  
wasting the slightest  
bit along the way . . .  
power is smooth, fluent  
and dependable.

## **CLUTCHES**

Maintenance is practically nil because the precision designing and production build clutches that last and last and last.

PRECISION-BUILT OF BASIC MATERIALS: STANDARDIZED,  
INTER-CHANGEABLE PARTS

*Write for bulletins. DL345*



*Illustrated:  
Conway  
Double-throw  
clutch*

**The CONWAY CLUTCH Co.**

**2745 Colerain Ave.**

**Cincinnati 25, Ohio**



**"SLASH" YOUR SET-UP TIME**

WITH THE  
**TREE**

**TAPER BORING TOOL**

Cut expensive set-up time from hours to a few minutes with the revolutionary TREE taper boring tool. You can use it on your present milling machine, jig borer or boring bar. Write today for complete information. In addition to boring taper holes this tool can be used for —



\*Straight boring . . . as shown at left used as offset boring tool.



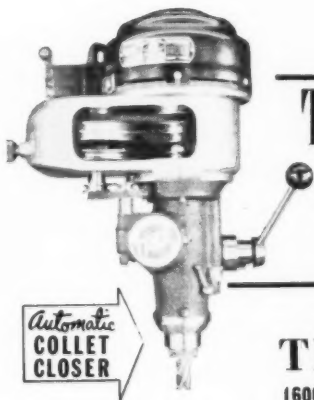
\*Facing . . . up to 10" in diameter.



\*Outside Turning . . . either straight or tapered up to 8" with extension bar.



Free Literature  
On Request



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COLLET  
CLOSER

## **TREE** UNIVERSAL MILLING HEAD ATTACHMENT . . .

All Angle Milling, Drilling & Boring.  
Compact Design, 3/4" Collet Capacity.  
4" Quill Travel. Power Feed Eight  
Speeds—

140-3500 RPM or 210-5200 RPM. Hardened  
& Ground Spindle & Quill. Enclosed  
Micrometer. Depth Stop.

For Full Information—Write Dept. B

## **TREE TOOL and DIE WORKS**

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When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



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### ON ALL FLEXIBLE SHAFT APPLICATIONS . . .

1. **Smooth, Positive Operation**—combining the best in design and construction, S.S.White power drive and remote control flexible shafts are noted for their smooth-running performance.
2. **Long Life**—S.S.White shafts are made of special grades of wire to exacting quality standards. And they're engineered to operate with low internal friction. When properly applied, they'll last for years.
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THE S. S. WHITE DENTAL MFG. CO. DEPT. H, 10 EAST 40th ST., NEW YORK 16, N. Y. —



FLEXIBLE SHAFTS AND ACCESSORIES  
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# ENGINEERED

## *Live Centers*



SHANK

GREASE SEAL

LARGE THRUST BEARING

LARGE RADIAL BEARING

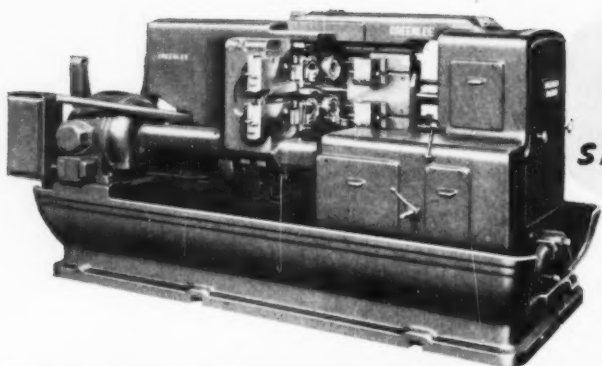
CUSHION ACTION

GROUND TRUE with BEARINGS

Standard shanks with Morse tapers carried in stock . . . send us your specifications and blueprints . . . we will see that your job is set up with the right LIVE CENTER.

# STURDIMATIC TOOL COMPANY

52 THIRD AVE. • DETROIT, 2 MICH.



**4**  
SPINDLE

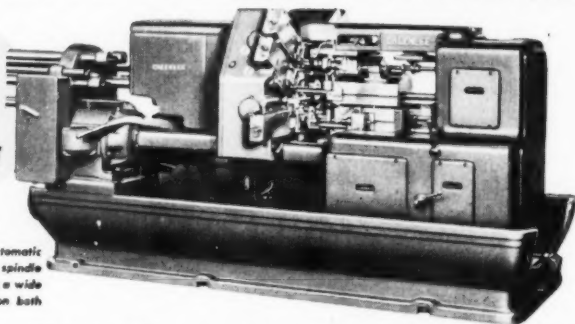
**THE GREENLEE "FOUR"**

A heavy-duty automatic made in 1½" and 2½" spindle capacities. The "Four" incorporates all the cost-cutting features of the well-known "Six" (see below).

# GREENLEE

## AUTOMATIC SCREW MACHINES

**6**  
SPINDLE



**THE GREENLEE "SIX"**

A ruggedly-built, high-speed automatic ... available in 1", 1½", and 2" spindle capacities ... capable of handling a wide range of work ... widely used on both short and long-run jobs.

## OUTSTANDING FEATURES OF ALL GREENLEE AUTOMATICS

*Write for literature describing in detail all the features of Greenlee Automatics.*



**UNIVERSAL TOOLING** — Tool holders fit any cross-slide cavity ... are easily and quickly changed ... reduce equipment costs.

**INTERCHANGEABLE CAMS** — Can be changed at will without re-adjustment of tools and holders. Cam storage is held to a minimum ... cam costs greatly reduced.

**BUILT-IN THREADING DRIVE AND FEED** — Not an extra attachment, but standard equipment on Greenlee Automatics.

**BUILT-IN COOLANT SYSTEM** — Eliminates cumbersome piping in tooling area ...

gets coolant right where it does the most good.

**LARGE TOOLING AREA** — Permits using many timesaving, cost-cutting auxiliaries that often eliminate second operations.

Various special adaptations of standard Greenlee Automatics can be made ... for handling second-operation work ... for tooling extra-long work pieces ... for multiple feed-out arrangements, etc.

Send us details of your work. Let our engineers show you how profitably Greenlee Automatics can be applied to your production.

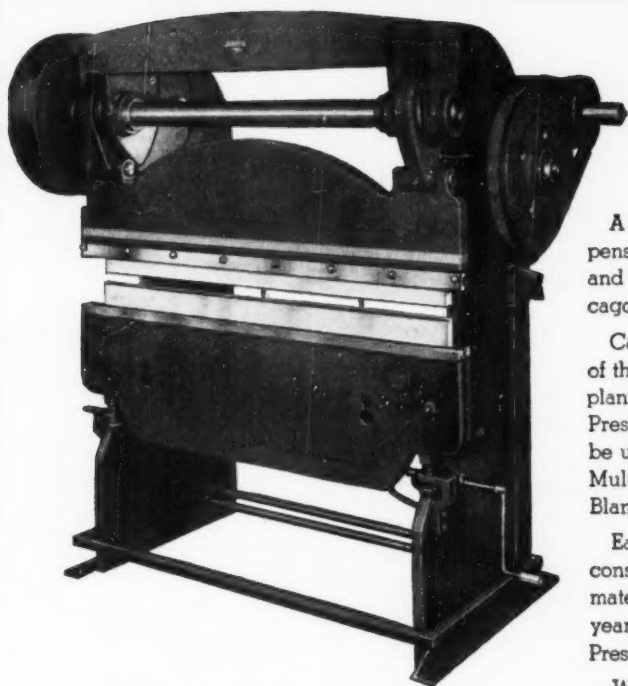
**GREENLEE BROS. & CO., 1833 Mason Ave., Rockford, Ill.**

MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES



# Powerful CHICAGO

## STEEL PRESS BRAKE



### TYPE "300"

A POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Forming Presses.

Can handle 40 to 50 percent of the work done in the average plant, thereby releasing the larger Presses for heavier work. Can be used for Forming Embossing—Multiple Punching, Notching, Blanking, etc.

Easy of operation, accurate and constructed of highest quality material and backed by over 45 years experience building Steel Press Brakes and Bending Brakes.

World's largest manufacturer of Steel Hand Bending, Power Bending and Power Press Brakes.

A dependable variable speed drive much desired by all users is standard.

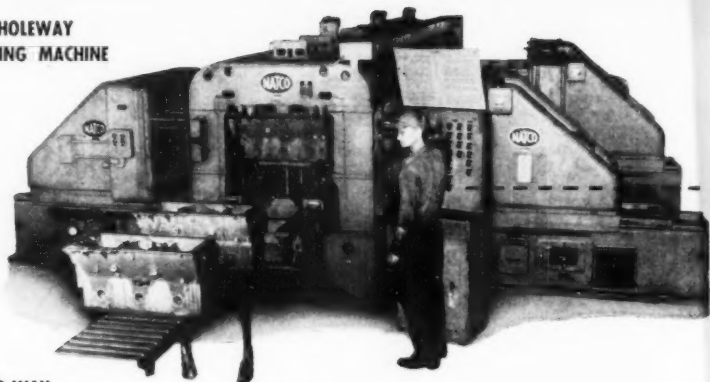
A Small Steel Welded Construction Press Brake a brute for punishment and a prodigious worker for the Sheet Metal Plant—

—3 sizes—capacities 10 gage, 4 ft. long; 12 gage, 5 ft. long; 14 gage, 6 ft. long. Powered by 1½ h. p. motor.

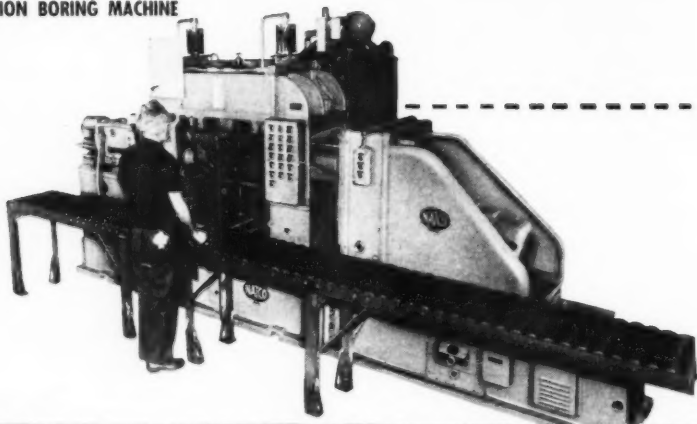
**DREIS & KRUMP MANUFACTURING CO.**  
7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS

# How NATCO Machines Speed Automatic Production.....

**NATCO HOLEWAY  
PROCESSING MACHINE**



**NATCO 3-WAY  
PRECISION BORING MACHINE**



**NATIONAL AUTOMATIC TOOL COMPANY, Inc.**  
**RICHMOND, INDIANA, U. S. A.**

Branch Offices:  
1809 Engineering Bldg., Chicago  
409 New Center Bldg., Detroit  
1807 Elmwood Ave., Buffalo  
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# ...from rough to precision finishing cam and crank holes

FOR A PROMINENT MOTOR CAR COMPANY

**PART**—Cylinder block.

**PRODUCTION**—66 parts per hour.

**OPERATIONS**—Core drill four crank bearings from rough to 2.6306. Core drill four cam bearing from rough to 2.4375—2.0625—2.0312—1.5625. Counterbore outer wall of cam bearing 1.8125 x .2344. Chamfer front side of four cam bearings 1/16" x 45°. Chamfer both sides of rear center crank bearings 3/32" x 45°. Comb. rough bore four crank bearings to 2.6718. Comb.

rough bore four cam bearings to 2.4846—2.1098—2.0778—1.6078. Comb. semi-finish bore four cam bearings to 2.6875. Comb. semi-finish bore four cam bearings to 2.5047—2.1297—2.0977—1.6277.

**MACHINE**—NATCO HOLEWAY Processing Machine completes all the above operations at one time, clamping, locating and processing from one operation to another automatically.

**PART**—Cylinder block.

**PRODUCTION**—45 parts per hour.

**OPERATIONS**—Precision finish bore four crank bearings to 2.691. Precision finish bore four cam bearings (in babbitt) to 2.3751—1.9971—1.9651—1.4971. Finish

counterbore two holes to .6202. Precision finish bore oil pump and distributor shaft holes to 1.0634" and 1.7499".

**MACHINE**—NATCO 3-Way Machine for the final precision operations on cam, crank oil passage and distributor holes.

★ **IMPORTANT READING**—NATCO invites you to read a new series of case histories. By taking you behind the scenes and getting down to hard facts, NATCO Field Engineers show you step by step how they make vital production savings possible through the application of small light sensitive NATCO Machines as well as

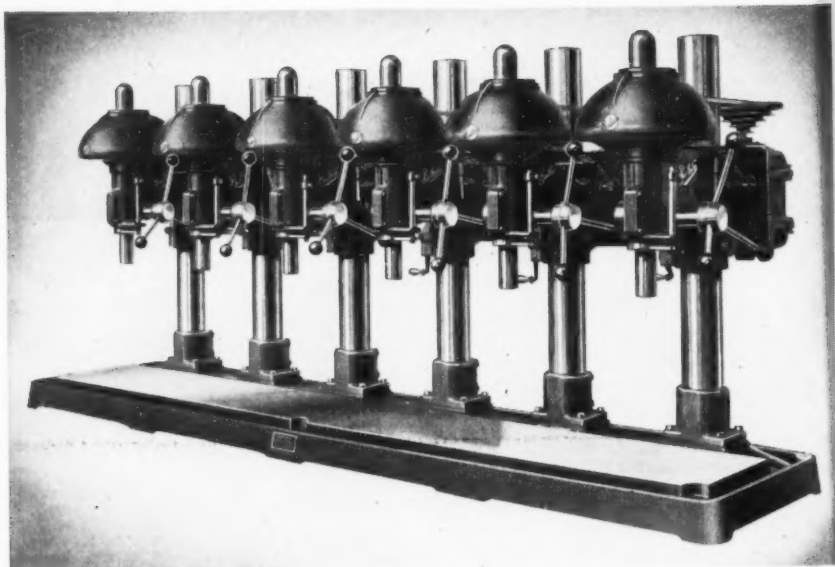
NATCO Automatic Processing Machines. Whether or not you are now receiving NATCO mailings regularly, be sure to send in your request for "Success Stories from the Brief Case of NATCO Field Engineers." Write today . . . request: Success Stories, Department 18, NATCO, Richmond, Indiana.



Call a *Natco* Field Engineer

**NATCO DRILLING, BORING  
TAPPING and FACING MACHINES**





**A "SET-UP" to Slash Set-Up Time!**

## *"Buffalo"* No. 18 Drills

Six spindles — the required operational set-ups on each drill — and production flows right down the line without hesitating for speed and other setup changes! Above is just one of the twelve models of husky, accurate, easy-handling "Buffalo" No. 18 Drills saving money for manufacturers! Capacities up to 1". Bench or floor models, one to six spindles. Put a No. 18 on your line and watch turnout ZOOM!



WRITE FOR BULLETIN 3123 B — choose from 12 models the one exactly suited to your production drilling requirements! All proven in the shop!

MACHINE  
TOOLS  
BY *"Buffalo"*

**PUTTING MORE PROFIT INTO YOUR OPERATION**

**BUFFALO FORGE  
COMPANY**

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Buffalo, N. Y.  
Canadian Blower & Forge Co., Ltd.  
Kitchener, Ont.

**DRILLING PUNCHING  
SHEARING CUTTING  
BENDING**

For  
More Accurate Selection  
of Quality End Mills  
**BROWN & SHARPE**  
OFFERS **8** ADDITIONAL  
TYPES



Extra Long, Fast Spiral Single-End Mill with Straight Shank.



Long, Fast Spiral Single-End Mill with Straight Shank.



Long, Two-Flute Fast Spiral Single-End Mill with Straight Shank.



Ball End, Two-Flute Fast Spiral Single-End Mill with Straight Shank.



Long, Fast Spiral Double-End Mill with 5/16" Straight Shank.



Long, Two-Flute Fast Spiral Double-End Mill with Straight Shank.



Fast Spiral Double-End Mill with 7/16" Straight Shank.



Two-Flute Fast Spiral Double-End Mill with 7/16" Straight Shank.



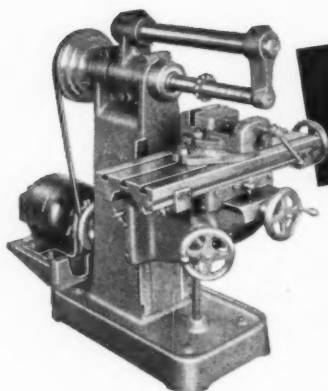
**WRITE FOR  
NEW HANDY-SIZE CATALOG**

describing important production-improving features of all Brown & Sharpe End Mills together with complete specifications and prices. There's a Brown & Sharpe quality end mill to meet every end milling need. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

*We urge buying through the Distributor*

**BROWN & SHARPE CUTTERS**





# BENCHMASTER *pays off 5 ways!*

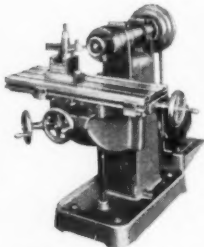
Where else can you find a low cost tool with so many cost-cutting possibilities?

**1 FOR HORIZONTAL MILLING** quill and overarm slip quickly and snugly in place. Timken Tapered Roller Bearings provide a rigid spindle support at high speeds as well as low. No. 2 Morse Taper.  $12\frac{1}{2}$ " horizontal table travel with a big 6" x 18" table area.



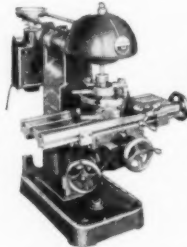
## 2 WANT A VERTICAL MILLER?

The same machine is quickly converted by substituting this special head. Again Timken Tapered Roller Bearings give smooth, chatter-free performance over a wide speed range. Accessories available: Full line of Benchmaster collets and drawbar; swivel-base vise.



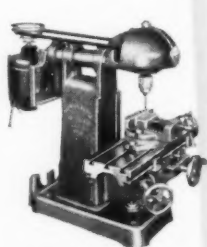
## 3 WHEN IS A MILL NOT A MILL?

Here's a handy kink to obtain extra *lathe* facilities for facing, turning, forming, etc. Benchmaster Accessories required: Tapered Adapter and Tool Block. By lowering knee position and raising tool you can swing up to 23". Exceptional capacity!



## 4 QUICK CHANGE ARTIST

Here's the Benchmaster converted to a grinder! Free-rolling bearings maintain high spindle speeds without overheating or risking bearing injury. Grinds internally, surfaces, sharpens cutters, etc. Note Benchmaster 6" Rotary Table—a fine accessory.



## 5 AND NOW IT'S A DRILL PRESS

The No. 2 Morse Taper in spindle accepts standard Jacobs Chuck Shank. Raising table feeds work into drill. With this setup, drilling layouts is easy—simply measure off correct hole spacing with the lead screws.

**NOTE:** BENCHMASTERS are also available with rack and pinion feed. For production work this provides exceptionally fast operation.

**BENCHMASTERS** are accurately built with all the care and precision of larger, more expensive tools... yet may be purchased for a fraction of big machine cost! Get our circulars on all BENCHMASTER EQUIPMENT!

- ★ For Precision
- ★ For Quality
- ★ For Value

*You can't beat a  
BENCHMASTER!*

Write Dept. MM-8  
for information

**benchmaster**

MANUFACTURING COMPANY  
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LOS ANGELES 4, CALIFORNIA



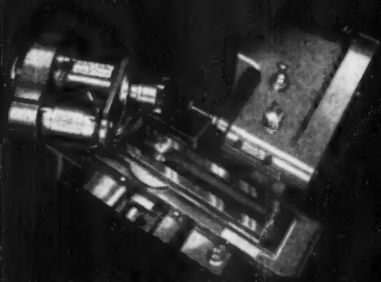
# ARTER



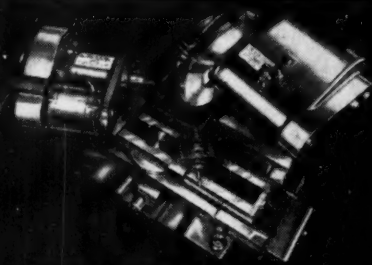
## **Model 103 Hydraulic External and Internal Grinder**

Here is versatility. ARTER hydraulic grinder, external or internal. . . . With internal head — capacity  $\frac{1}{8}$ " to 3" dia. x 4" long — or external head — capacity 3" dia. x 10" long. Swing over table, 9".

Here is an economical, dual purpose grinder — internal only or external only — or both.



*Internal grinding head  
with work head swiveled.*



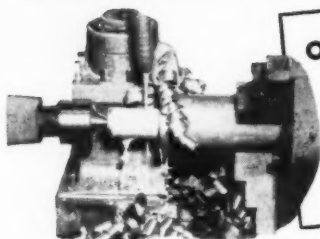
*External head swiveled with  
quick collet closing attach-  
ment and radius dresser.*

## **ARTER GRINDING MACHINE COMPANY**

**WORCESTER, MASSACHUSETTS • U. S. A.**



# BOOST OUTPUT... CUT COSTS



Turning 4" bar SAE 1350 and using Ideal Live Center. Feed is .007 at 500' min.

ON LIGHT OR HEAVY JOBS  
USERS SAY

*"Savings Up to  
50%"*



- Faster Speeds
- Deeper Cuts
- High Accuracy
- No Gouging or Burning

Illustration shows the IDEAL "Multi-Duty" Center with Male point. Female and Pipe Type Points Also Available.

Also Heavy Duty Live Center—built to carry heavy loads, with accuracy to .0005.

## IDEAL LIVE CENTERS

From all over the country the reports come in: — IDEAL Live Centers consistently step-up both man-hour and lathe output. Savings range up to 50%. Quality and accuracy is markedly improved.



Using IDEAL Live Center to turn 3" dia. cast iron bar at approx. 225 surface feet a minute ( $\frac{1}{8}$ " wide cut; 300 RPM; .015" feed).

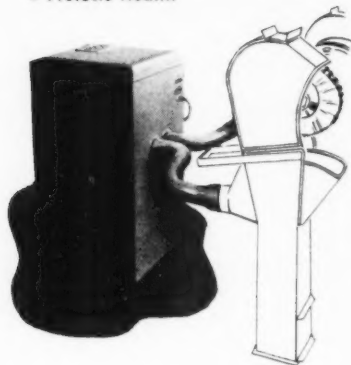
IDEAL Live Centers give you higher turning speeds with complete safety. Because there's no friction between center and work, they never gouge or grab—never overheat. Spoilage is minimized . . . you can take deeper cuts. Unique bearing construction assures maximum rigidity. Accuracy is permanently safeguarded by bearing seal that keeps out cutting oil, dirt and chips. Operators can turn out quality work faster because "center problems" are eliminated, permitting full attention to the cutting operation. Tested and proved in the hardest kind of service over many years. A 2-to-1 favorite over all others! Get the facts from your IDEAL Distributor right away.

**IDEAL**

## JOB-PROVED PRODUCTION SHORTCUTS

### Stop Dust Damage!

- Lengthens Equipment Life
- Protects Health



### IDEAL DUST COLLECTOR

Operators are safer, machines last longer and work spoilage is reduced with an IDEAL Dust Collector. Low cost way to remove abrasive dust, metal particles, fine chips from grinding, sanding, buffing or machining operations. Twin inlets and twin cyclone separators handle 500 cfm of air. Heavier dust particles are removed by separators, fine dust by the oversize filter. Warm, clean air discharged back into the room prevents heat waste. Collector is unit type, easy to install—no complicated duct work. Uses small floor space.

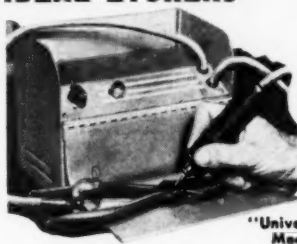
DISTRIBUTED THROUGH AMERICA'S LEADING WHOLESALERS

**IDEAL INDUSTRIES Inc., Sycamore, Illinois**

Canadian Distributor—Irving Smith, Ltd., Montreal, Canada

**IDEAL**

### IDEAL ETCHERS



Instantly burn permanent mark into iron, steel or their alloys

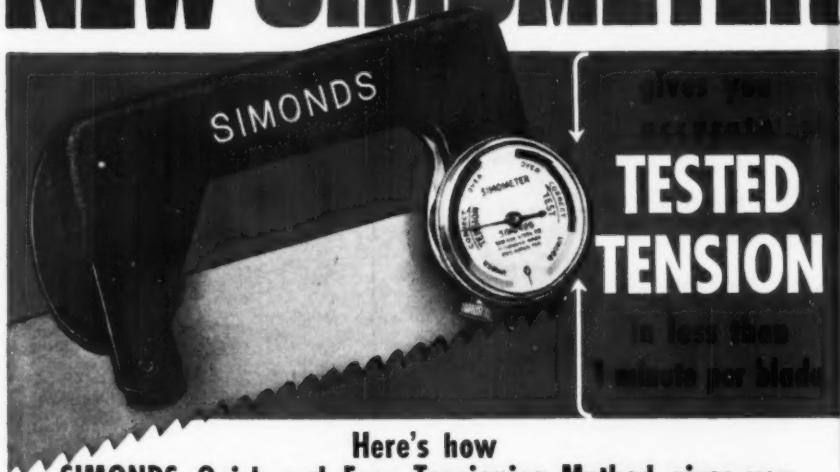
Use it for every kind of marking—easy as writing with a pencil. For part numbers, sizes, material description, names on tools, serial numbers, etc. Easily portable, nothing to get lost. Safe. "Universal" Model — four etching heats, 120, 240, 420 and 700 watts.

### IDEAL DEMAGNETIZERS

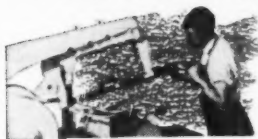


Speeds milling, drilling and cleaning jobs. Demagnetizes work from magnetic chucks, also tools, punches, dies, etc. Prolongs tool life. Simple to use. Two "surface" models for small or large work. Also "hand" model.

# NEW SIMOMETER



Here's how  
**SIMONDS Quick and Easy Tensioning Method gives you  
 LONGER BLADE LIFE!**

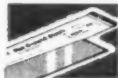


**Avoid Undertension** which causes crooked cutting, spoiled work, lost time.

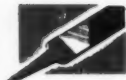
**Avoid Overtension** which causes blade-vibration, rapid dulling of teeth, frequent blade-breakage.

**Slip the Simometer Directly over Blade**, tighten two thumb-screws... now put tension on blade until **Simometer** needle moves into green zone... and you can see at a glance you have the right tension on the blade. Ask your distributor.

## SIMONDS ALSO MAKES:



FLAT GROUND STEEL STOCK



"RED END" FILES



METAL-CUTTING BAND SAWS



CIRCULAR METAL-CUTTING SAWS

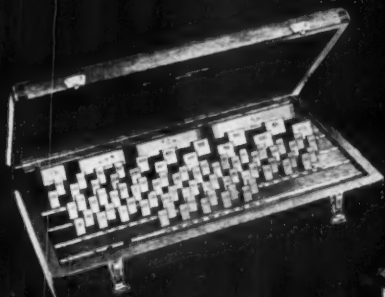
## SIMONDS "Red End"

### HACKSAW BLADES

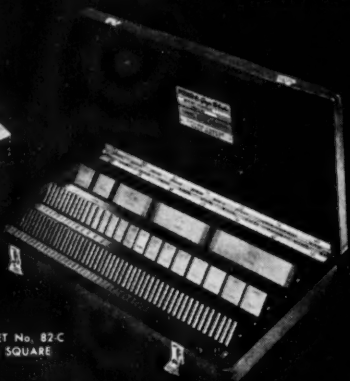
**BRANCH OFFICES:** 1150 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Avenue, Portland 4, Ore.; 31 W. Trent Ave., Spokane 6, Washington. **Canadian Factory:** 595 St. Remi St., Montreal 30, Que.

# ONLY FONDA MAKES COMPLETE SETS OF Lifetime-Carbide GAGE BLOCKS

... in the full range of sizes



SET No. 82-C  
RECTANGULAR



SET No. 82-C  
SQUARE

## OUTLASTS ORDINARY STEEL GAGE BLOCKS

*by 139 to 1*

- ◆ Surface finish 0.15 to 0.3 micro inch rms. Almost absolute perfection.
- ◆ Superior wringing qualities — wring best when dry and clean, assuring greatest accuracy.
- ◆ Retains original accuracy and Surface Finish.
- ◆ Will not rust or corrode.
- ◆ Guaranteed against breakage.

Write for  
REPLACEMENT PLAN  
AND FREE CATALOG  
46-1



**FONDA**

**GAGE COMPANY**  
STAMFORD - CONNECTICUT

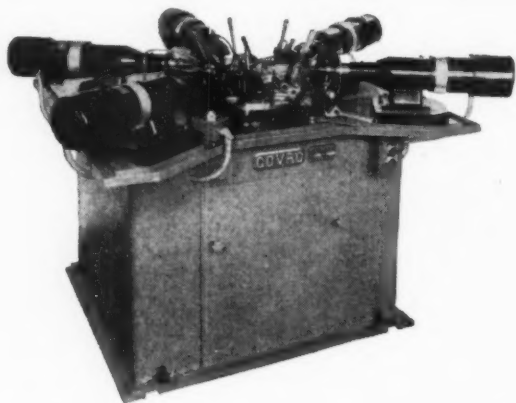
A recent analysis, made by one of the largest manufacturers of Office Machine Equipment, using a total of 260 sets of steel gage blocks, indicated that the cost of their gage blocks including a rigid inspection and replacement program amounted to \$466,000 during a ten year period.

Replacement of these steel blocks with Fonda Lifetime Carbide will result in a saving of \$538,000 over a period of only twenty years.

Our representative would be pleased to assist you in analyzing your steel gage block cost and point out the savings made possible by replacing steel with Fonda Lifetime Carbide Gage Blocks.

## also... FONDA "ultra-finish" STEEL GAGE BLOCKS

... complete sets and individual sizes ... standard inch and metric measurements ... maximum accuracy, longer wear, finer finish and superior wringing qualities. **They make FONDA Steel Gage Blocks superior to all others.**



## Drilling, Chamfering, Tap-Drilling and Tapping...In One Loading

**T**he variety of ways in which Govro-Nelson Automatic Drilling and Tapping Units can be used to reduce production time is illustrated by the above set-up of 4 drilling units and 1 tapping unit for drilling, chamfering, tap-drilling and tapping the hole for the adjusting worm of a wrench — in 5 seconds per wrench.

The four operations are performed simultaneously by means of a Govro-Nelson 6-station indexing dial, interlocked electrically with the units. By dividing the tap-drilling operation into 2 stations, the total drilling time is cut in half and the problem of chip is greatly reduced.

If you have similar operations, send samples and part prints and we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up. Literature sent upon request.

**WRITE FOR  
*Literature***

**GOVRO-NELSON CO.**

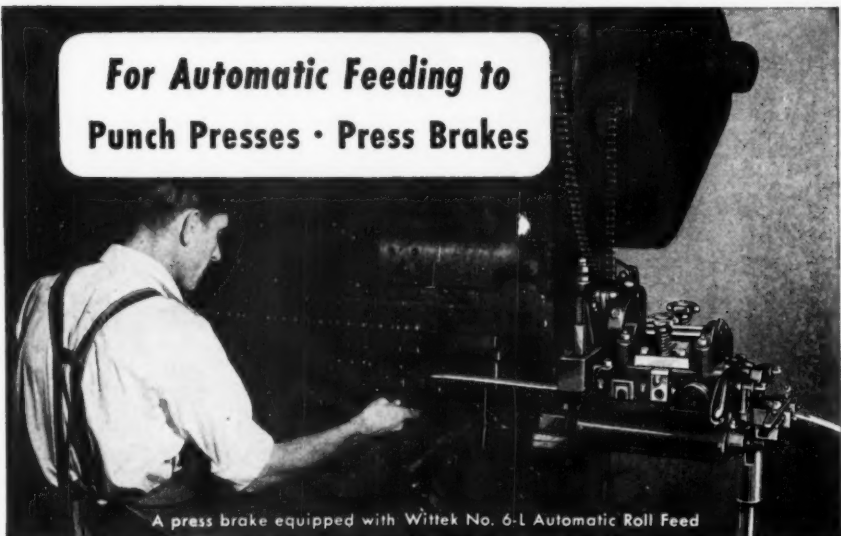
*Machinists of Precision Parts  
for 25 Years*

1933 Antoinette, Detroit 8, Mich.

*Automatic*

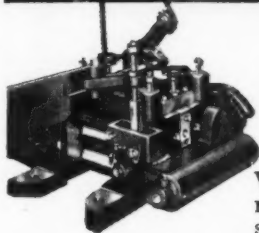
**DRILLING UNIT**

**For Automatic Feeding to  
Punch Presses • Press Brakes**



A press brake equipped with Wittek No. 6-L Automatic Roll Feed

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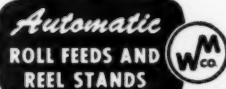
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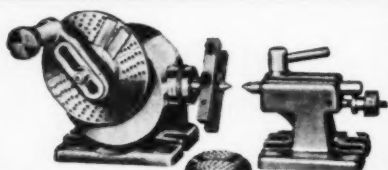


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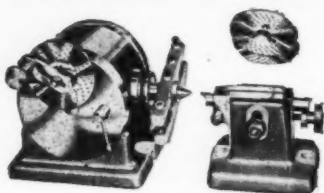
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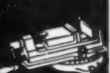
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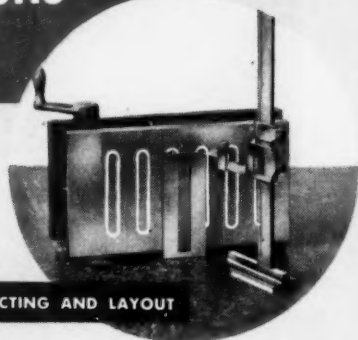
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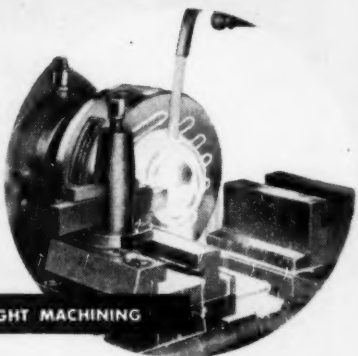
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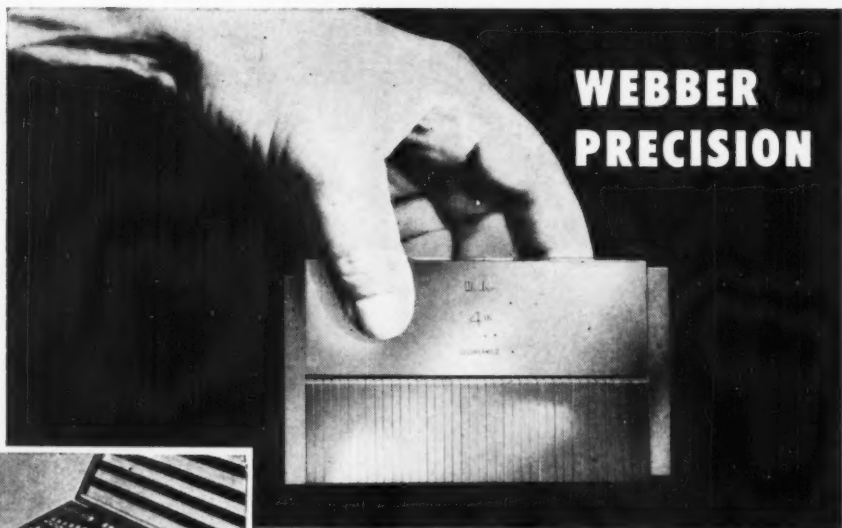
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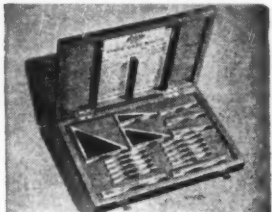
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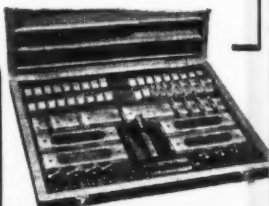
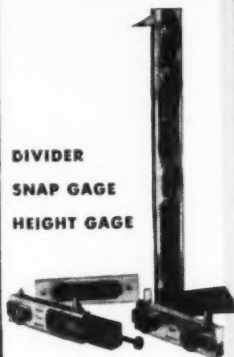
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# Featured in this issue . . . . .

**A FAST, NEW METHOD OF INSPECTING AIRFOIL CONTOURS OF BLADES**, by Edward C. Polidor. Designed originally for the checking of turbine blades, the Pant-O-Scriber is also used to check forging dies, master patterns, and other blade shapes. A permanent record of the inspection may be retained for future use. Page . . . . .111

**MASS PRODUCTION FLOW ADAPTED TO SMALL LOT PRODUCTION**, by Gerald Eldridge Stedman. The Mission Mfg. Co. produces products only in small lots. As manufacturers of drilling equipment they need a wide range of sizes in their products. They have managed to utilize latest production techniques on a mass production basis. Page . . . . .123

**RE-SURFACING RUBBER ROLLERS WITH HEAVY DUTY ENGINE LATHES**. When the rubber rollers, which are used on large printing presses, become worn they must be resurfaced, always a slow and expensive operation. The development of special heavy duty engine lathes for these operations has speeded the resurfacing of rubber rollers in many printing plants. Page . . . . .135

**FLAME SPINNING, A NEW METAL FORMING METHOD**. Tubes are rotated rapidly under an oxy-acetylene flame. A hard forming tool then closes the tubes, or forms them to the desired shape. Page . . . . .143

**LETTER FROM ENGLAND**. Page . . . . .153

**NEW ALPHA ALUMINA ABRASIVE**. This new abrasive, 32 Alundum, developed and perfected by the Norton Co., is claimed to run cooler, dull less frequently, and obtain more grinds per wheel. Page . . . . .158

**NEW WELDING TECHNIQUE**. Page . .166

**NEW STEEL DEVELOPED BY J & L**. The new steel, it is claimed, will reduce costs, can be machined to a finer finish, and takes the place of previously expensive alloys. Page .172

**SHOP HINTS**. Page . . . . .176

**AVAILABLE LITERATURE**. Page . . .186

**NEW FILMS**. Page . . . . .192

**NEW BOOKS**. Page . . . . .198

**WHAT'S NEW IN METALWORKING**. Page . . . . .203

**EFFECT OF QUANTITY ON MACHINE SELECTION**, the 12th lecture of the NMTBA Sales Refresher Course Lectures. Mr. Weaver, of the Westinghouse Electric Co., discusses the main approaches to use when selling a manufacturer who produces in large quantities or the manufacturer who produces only in short lots. The salesman must know his manufacturers and their problems. Page . . . . .288

**SELLING TOOLS**. Lecture No. 13. Mr. Brockman, of the LeBlond Machine Tool Co., stresses the importance of sales selling tools: booklets, movies, testimonials, catalogs, drawings, photos, etc. The success of the salesman depends on his ability to use his selling tools effectively. Page . . . . .302

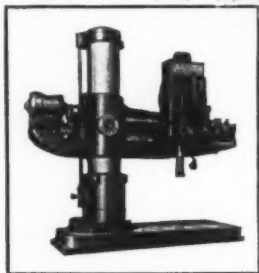
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**MECHANICS THROUGH THE AGES**. Page . . . . .340

**PRODUCTS INDEX**. Page . . . . .342

**INDEX TO ADVERTISERS**. Page . . . .350



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## On EVERY JOB you do—

The smooth, chatterless, powerful and durable drive of the Cincinnati Bickford Super Service Radial Drill is a success factor in every job you do.

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# As the editor SEES IT . . . . .

## WE CAN — AND THE TIME IS NOW

Have you ever noticed the thousands upon thousands of old cars, ten or more years of age, that creak and groan their laborious way over our highways? When talking with people, are you as astonished as we are how few of them own television sets, automatic washers, mangles, dishwashers, or 1947 or 48 refrigerators, although owning one or more of these modern conveniences is one of their rosiest dreams? When you visit another's plant, and go snooping about with bright eyes that miss nothing, do you not say about some of the tools, "they ought'a give some o' these babies to the Smithsonian Institute?" Of course you've noticed, you've been astonished, and you've made cracks about someone else's equipment.

If you've noticed, been astonished, and made cracks, you probably realize the mountains of cars, washers, refrigerators, machine tools, attachments, general industrial equipment, and fifty million other items which the American consumer and business man needs . . . and wants. The demand is there, but whether or not it is satisfied depends upon men, machines, and management; they are at the controls.

The halcyon days of order taking are over, and an adjustment must be made by men and management in the face of increasing buyers' resistance. Labor must realize that wages cannot be driven up into the stratosphere; the gentle art of feather-bedding, perfected nobly in the building trades, must go; the theory of producing little and asking much is a thread-bare carpet which covers a multitude of sins . . . high production costs, unstable working relations, faulty production estimat-

ing, and others which each man can list himself. Labor must become allies with management to reduce costs and prices.

Management, always more delicately adjusted to buyers' demands than labor, must also revise its thinking. Prices must come down before the public is priced out of the market; management must stop fighting the government, labor, and the public (through high prices) and concentrate on the immediate job at hand . . . meeting the demand. Management and labor must "work" together, not merely "get" together. Merchandising and selling must be intensified, and advertising can pave the way.

With labor willing to face management's problems and management willing to admit that labor can be a help rather than a hindrance, there remains but one additional factor: machines!

Today we cannot produce economically with equipment, circa 1920, whose belts are flapping and slapping in the breeze. Sometimes management is deluded into believing it can . . . but it is just that . . . a costly delusion. We can't expect maximum production from labor by giving them a file and a piece of emery cloth instead of a 1948 surface grinder. On the other hand, labor must revise its opposition to modern tools; progress cannot be resisted, neither by labor nor by management.

Let labor and management co-operate, let new machines replace museum pieces, let management streamline its operation and intensify its selling and merchandising, and demand will be met with profit to everyone. We can do it, and the time is now!

*William F. Schleicher*



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The inspector's signature also means that the Ryerson Alloy Certificate sent with the steel correctly charts hardenability for the particular bars shipped. This Certificate proves that the steel will meet performance requirements—enabling you to

buy on the basis of hardenability with complete safety. Heat treating? The Certificate guides you to quick, accurate results.

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# RYERSON STEEL



## A NEW, FAST METHOD OF INSPECTING

### *Airfoil Contours of Blades*



by **Edward C. Polidor**, Chief Engineer, Engineers Specialties Div., The Universal Engraving & Colorplate Co., Inc.

The new Pant-O-Scriber Blade Checking Machine was designed as a fast, economical method of checking blades, forging dies, master patterns, and cast or forged blade vendors. Inspectors can see the entire profile of each section being checked and their relationship for twist or displacement. Blades are inspected also in relation to the center of gravity.

**T**HE GREATLY increased production and development schedules demanded for jet aircraft motors have necessitated faster and better methods for inspection of the critical turbine blades and compressor vanes.

A jet motor may have anywhere from 800 to 1500 blades in its engines. Turbine blades may vary in size from less than half an inch to over 6" in length. Some are twisted, some are tapered at the tip and most are thinner on one edge than on the other, like a knife blade. Inspection of blades is important because one defective blade might throw a whole turbine out of balance, disastrous in an aircraft engine.

The Pant-O-Scriber Blade Checker, is an automatic machine which was built and then proven under actual production inspection line conditions, working with one of the leading jet motor plants. Its operation was clocked at 43 seconds for a 3 section blade, which was completely checked for contour, twist, thickness, width, etc., in less than one minute. A permanent inspection record of each blade is obtained at the same time as it is inspected. Further, the Pant-O-Scriber may be used to inspect master patterns, forging dies,



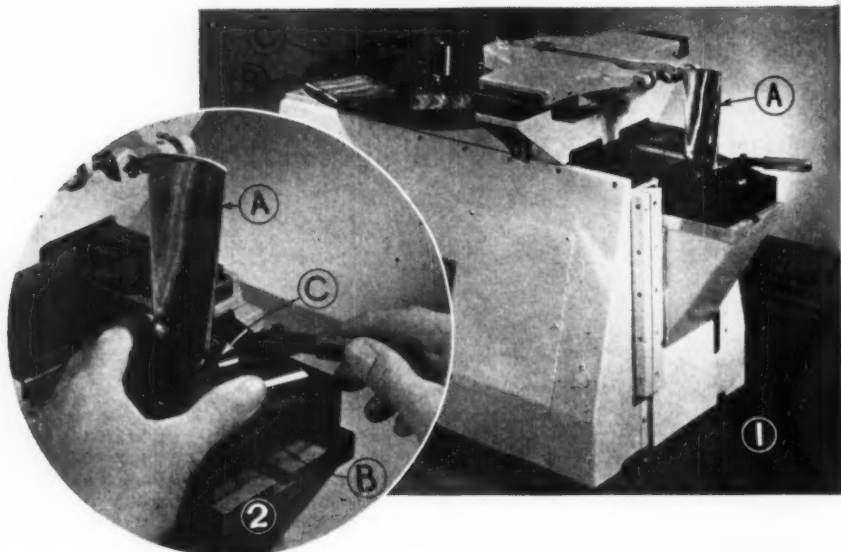


Figure 1. A Pant-O-Scriber Blade Checker used for checking 3 sections of a finished turbine blade. The blade "A" is held in fast acting holding fixture "B". Figure 2. The holding fixture is a duplicate of the mating assembly and the blade is held in the fixture by a set of fast acting cam locking, clamping jaws. The Blade is also positioned in the holding fixture locating on the leading edge "C". The indexing table "B", Figure 1, for holding the Pant-O-Scribing glass "C" automatically rotates a known distance as the blade "A" is automatically indexed for checking sections E-E, C-C, and A-A.

• • •

cast or forged blade vendors" or on such production or research projects where a permanent inspection record is desired.

The Pant-O-Scriber Blade Checker automatically traces the blade at the sections to be checked, (usually 3 sections). A co-ordinated rotating scriber automatically produces an exact scribing on a specially coated glass plate of each section as traced. The sections are scribed on the glass plate in relationship to the edge of the glass and to each other. The coating is a pleasing soft green color.

A precision master inspection chart, actual size of the blade, is used together with the scribed plate for in-

spection purposes. The scribed plate and the inspection chart are placed face to face to a predetermined registered position and the scribed blade profile and the master inspection chart are thus projected at any desired size on to a white opaque projection screen, using a standard make vertical lantern slide projector.

For production inspection purposes a "go and no go" Bridge Tolerance Chart (Patents Pending) is used. This chart is precision made to the same actual size of the blade and section spacings of the blade; however, the permissible tolerances are shown on the chart as a series of alternate red and white "bridges", the outside of the

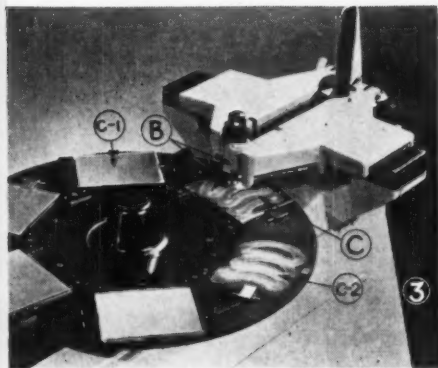


Figure 3 shows the tracer rollers (A) in contact for tracing section "A-A" of the blade, and scribing cutters (B) scribing the A-A profile on the Pant-O-Scribing Glass (C). (C-1) shows the unscribed and (C-2) the finished scribed glass as the table automatically rotates clockwise in synchronization with the automatically controlled tracing arms, scribing cutters, and indexing of the blade.

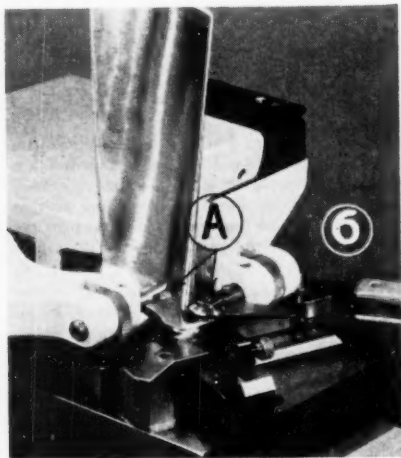
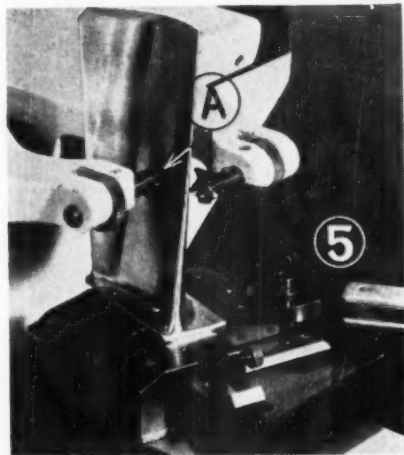
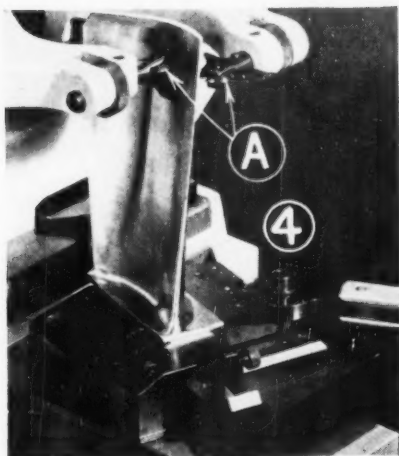
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bridges are connected by a wide red band. When an acceptable blade is viewed on the projection screen, the operator sees a series of white "windows" created by the contrast of the green scribed blade profile and the red "go and no go" Bridges of the Tolerance Chart. The "windows" of light must appear within the bridges and any off tolerance condition is easily discernible. The scribed plate can be retained as a permanent inspection record of the blade, or a microfilm photo record of the projection screen can be made. The scribed glass plate can be recoated and used again and again. (Photo shows chart as a dark gray and the blade contour as light gray.)

A special measuring stage, which fits over the lantern slide projector is supplied for engineering and re-

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Figures 4-5-6 show tracing rollers (A) as they traverse across sections E-E, C-C, and A-A respectively. (Note the differing locations of the automatically indexed work-stage.)



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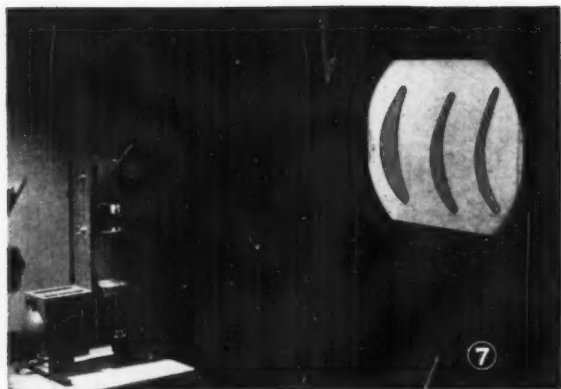


Figure 7 shows the standard 3 1/4" x 4" Vertical Delineascope with a portable projection screen. The "one to one" ratio master Red Bridge Tolerance Chart and the Pant-O-Scribed blade contours are seen projected on the screen. (The Red Bridge Tolerance Master shows as dark gray and the green scribed profiles as lighter gray in these photos.)

search purposes. This stage is used for measuring the amount of deviation of twist, displacement, thickness, contour profile, etc., when desired.

Actual records have been made with the Pant-O-Scriber Blade Checker of blades prior to assembly in jet engines. After periodic test runs of 25 hours, 50 hours, etc., the same blades were again put through the Pant-O-Scriber and the scribed profile at the successive test periods were compared with the master inspection chart and records retained. Similar records showing the effect on the blades of heat temperatures, etc., are valuable to the engineering and research departments in developing better engine performance.

#### Basic Principles

The basic principle of the Pant-O-

Scriber incorporates an X and Y pre-loaded ball-bearing movements and tractor roller. An adjustable and interchangeable roller, having a .250 radius, is attached to one end of an arm, on the opposite end of which is incorporated a motor driven free-floating rotating spindle. This spindle carries a single "fly-tool" type of scribing cutter head.

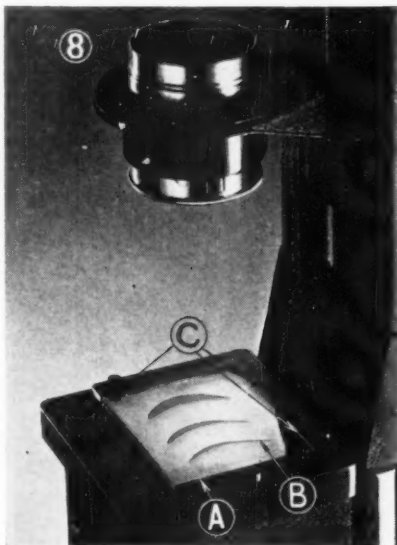
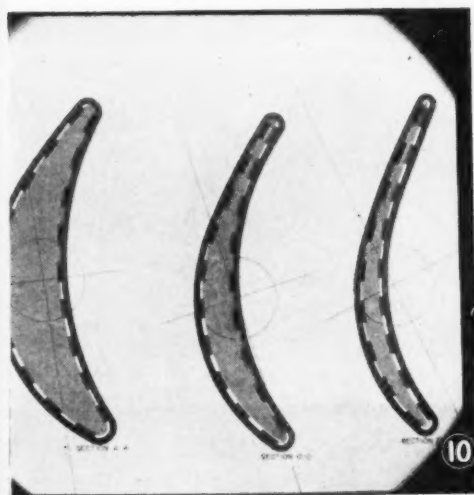


Figure 8. The Master Chart (A) is locked securely in position on the table of the delineascope. The Pant-O-Scribed glass (B) is placed against the three stops (C) thus duplicating the positioning of the glass when held on the rotating table of the Pant-O-Scriber. It is then in exact register with the master chart. As the scribed blade profiles and the master chart are placed face to face on the delineascope, they are within the focal plane and can be focused sharply in projection.



Figure 9. Photo of screen as seen when using the envelope line tolerance style master chart (black lines) and green Pant-O-Scribed blade contour, (gray on photo). The blade profiles must be seen within the double contour lines in order to be an acceptable blade.

Figure 10, is a close-up photograph of screen as seen when using Red Bridge Tolerance Master Chart. The red of the master appears as dark gray on photo while the green Pant-O-Scribed Contour as lighter gray on photo. The Red Bridge Tolerance master permits faster inspection operation as the operator simply looks for the "windows" of light between the Red Master and Green blade profiles. The permissible tolerance is the depth of the "bridges". Therefore the inspector must see light in the windows all around (as seen on convex side of section A-A), but must not see light beyond the windows (as seen on lower convex area of section C-C). An absence of light windows will indicate oversize areas of the blade which will appear as dark brown on the heavy band, (combination of green and red colors). This shows as black on the illustration. The cross lines denote the center of gravity of each section of the blade, and twist angles. The circles are used for aligning the master chart and the Pant-O-Scribed blade. The contours on the master chart are in the proper position and relationship to the blade as it is scribed on the Pant-O-Scribing glass on the machine.



This cutter rotates in circles which are exactly the same radius as the tracer roller. Two such arms are employed, one for following each side of the blade. As the rollers move across the blade in the X plane, the motor driven scribing cutter duplicates the movements and in so doing, "cuts" or "scribes" the green film from the Pant-O-Scriber glass. The rollers and scribing cutters are positioned so that the tracer roller and scribing cutter of one arm are

ahead of the corresponding units of the other arm. This enables the tracer rollers to travel sufficiently around the leading and trailing edges of the blade for scribing a true profile of these edges during its operation. The arms are also mounted on a cross beam in the Y plane.

As the blade is indexed to the second gaging position, the Pant-O-Scriber Glass also moves a known distance and the second section of the blade is

Figure 11. Photograph of the screen showing the alignment tests for determining that the tracer rollers, scribing cutters, the blade holding fixture, indexing of glass-holder rotating table, and master chart on the delineascope are all correctly aligned.

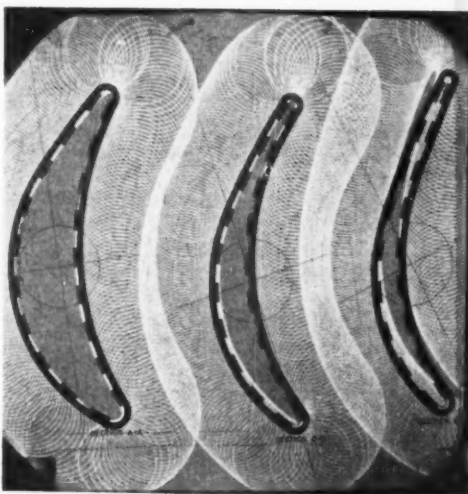
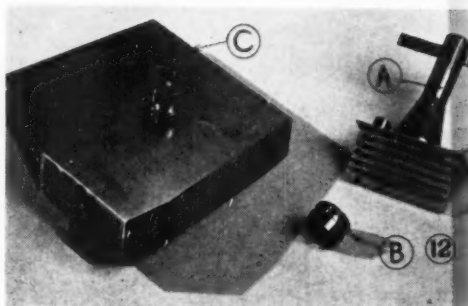
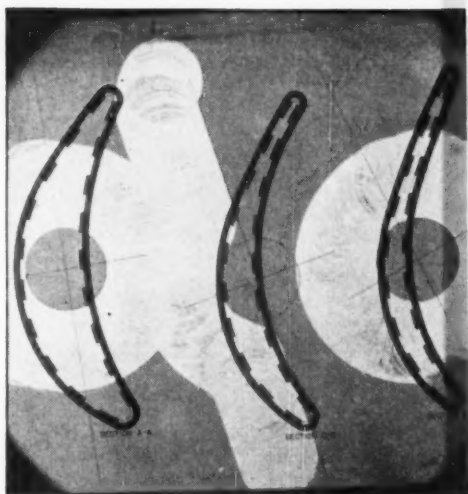
Figure 12 (A) shows the setting master which has a dovetail the same as that of the blade root. The master is clamped in the blade holding fixture (Figure 2-B) and the .005 diameter pin and axis of cross T are Pant-O-Scribed. The scribed glass is then placed on the delineascope in register with the master chart. The twist centerline and 3 circles must all coincide with the master chart as seen on the screen and Figure 11.

• • •

Figure 12 (A) is the setting master described above; (B) is a scribing cutter-head showing single "fly-tool" carboloy scriber; (C) shows jig for grinding and reshaping the scribing tools. The scriber head with carboloy tool in place is fastened on a taper and threaded pin. The jig is placed on the grinder in successive positions 1-2-3 and 4 as stamped on the jig. Measurements are checked by inserting a pin in the holes provided and measuring the distance noted for each position. The carboloy scribing tools are long lasting and only require reshaping occasionally.

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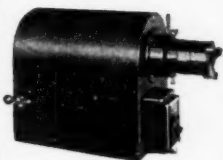
Figure 13 is a photo of screen showing the effects of blade distortion after a motor was test run for 25 hours. The background shows the scroll action of the revolving scriber tool. A clear edge is obtained around the blade profile. The scroll effect can be completely removed if desired as seen in Figures 9 and 10 by control of the speed of the spindle.



scribed on the same glass. The blade again is indexed to the third gaging position, and likewise the Pant-O-Scriber glass moves a known distance and the third section of the blade is scribed on the same glass.

The Pant-O-Scribed glass plate is then removed from the machine and placed on the table of a standard vertical type Delineascope. A precision "one to one" ratio master chart is properly positioned on the delineascope, and the Pant-O-Scribed glass is placed in register with the master chart. Both the master chart and Pant-O-Scribed glass are in the proper focal plane and both are simultaneously projected on to an opaque white projection screen. The blade contour and master in contrasting colors are in true relationship to each other as projected on the screen. This relationship would be unaffected by any possible imperfection of the projection lens.

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PER  
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HOUR**



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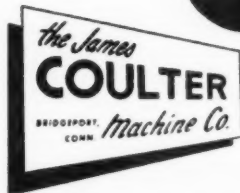
2064 READING RD., CINCINNATI 2, OHIO, U.S.A.

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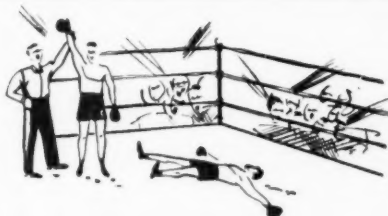
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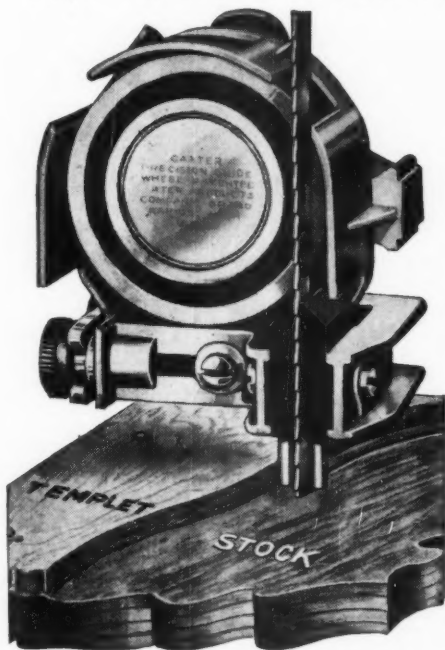
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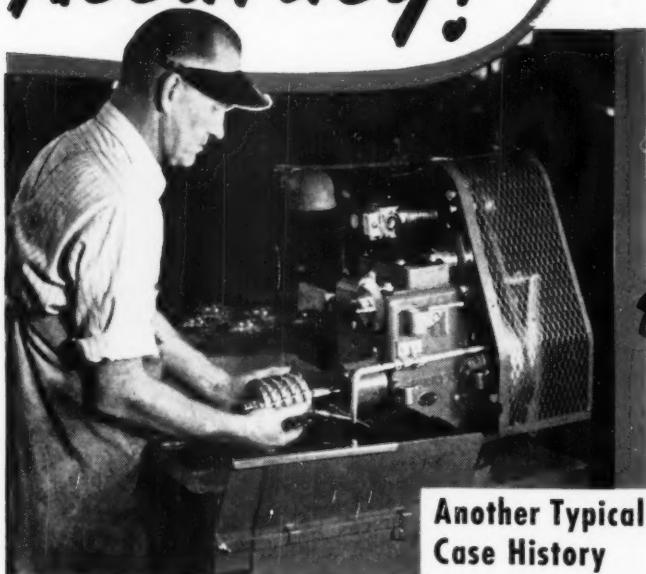
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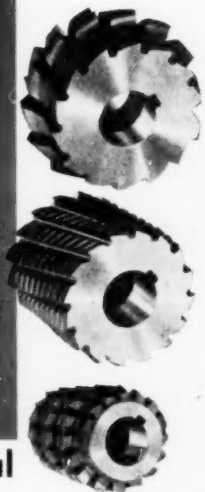
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# Accuracy?



## Another Typical Case History



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— Barber-Colman Company, Rockford, Illinois

"Sunnen Honing has almost eliminated rejections of hobs and milling cutters; and we are working to tolerances of .0002". Costs were cut; and surface finish has been improved. True geometric accuracy permits holding standard sizes easily."

Tools shown at right have bores ranging from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ " in diameter, and from  $\frac{1}{4}$ " to 4" in length. Material is hardened steel, Rockwell 65-C."

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## CARBIDE BURS

## MASS PRODUCTION FLOW ADAPTED TO

### *Small Lot Production*



by Gerald Eldridge Stedman

The Mission Mfg. Co., manufacturers of slush pump valves, fluid and pistons, piston rods, and other drilling equipment have organized their production to take advantage of every mass production device capable of reducing costs. Their tooling is clever . . . production is high.

**C**ENTER of the nation's petroleum industry, Houston, Texas has 273 oil fields producing nearly 200 million barrels of oil per year within a 100 mile radius; and 14 of the largest refineries are at its borders, including Humble's Baytown plant, largest in the United States. Fourteen counties in the Houston region, representing 5 per cent of Texas area, account for 20 per cent of the State's crude and 9 per cent of total petroleum production for the entire United States. Refinery capacity amounts to 40 per cent of the state and 11 per cent of the United States total.

This concentration of petroleum industry within the Houston area has led, naturally, to its growth as leading center for the manufacture of that wide range of rugged equipment essential for oil field and refinery operations. Among such plants, the Mission Manufacturing Company produces a line of slush pump pistons, rods and other parts used in the oil countries of the world.

Mission gained acceptance for slush pump valves, fluid and pistons, piston rods, gland packing rotary slips, swabs, plug valves. Making no compromise with mediocrity, and backed with a full money-back guar-

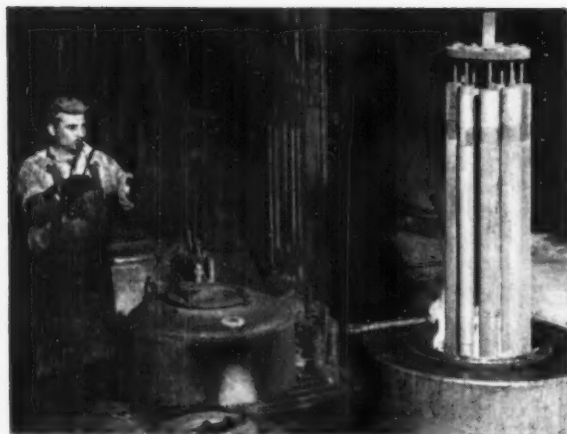


Fig. 1. Jig of slush pump rods being quenched in tank of cooled, circulating oil, after being gas carburized in furnaces in back ground. A file-hard case is obtained.

antee if its products are not found more economical in use, Mission has gained enviable recognition around the globe. Much of its production goes to export, and my cursory examination of packaging for export on its shipping floors during my visit there, I counted shipments to 19 countries.

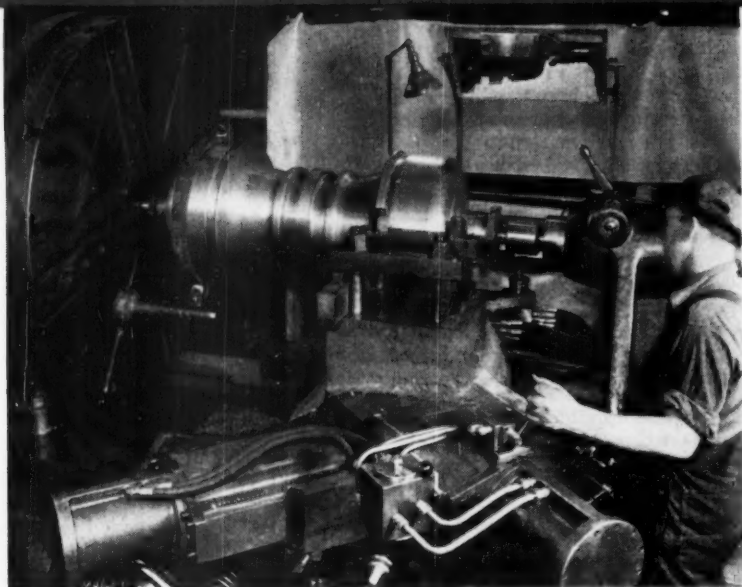
Mission Manufacturing Company was organized in 1929 by the Sharp brothers and two friends, whom they later bought out. W. B. Sharp is now board chairman, Dudley C. Sharp, president. Their father, whose Producer's Oil Company evolved into the Texas Oil Company, originally financed the elder Hughes in Hughes Tool Company, of which the much publicized Howard Hughes, his son, is now president. The elder Sharp died in 1912, and his widow sold out her Hughes interests.

Varying soil and hot mud conditions, such, for example, as salt reactions in corrosive attack impose unusual burdens, hazards and peculiarities upon slush pumping in well drilling. Fluids may be viscous, abrasive, corrosive — all creating rapid part wear of slush pumps. Rotary drilling uses such pumps and Mission produces valves, seats, rods, pistons, gland packing exclusively for

that service under these peculiar conditions for such pumps. It does not produce the pumps themselves. It manufactures these components for installation in such pumps. It is, therefore, in reality an accessory manufacturer. Some of its techniques are secret and cannot be detailed. For example, Mission has found a method to chrome plate piston linings and rods as a corrosion preventive to gain a deeper case than I have believed possible.

Most Mission components are of such SAE steels as 3140, 4140, 5130. Most production is in small lots; runs of 100 units being unusual. Well drillers are individualistic and tend to special designs that fit personal needs. There are over 250 piston rod sizes in the Mission line. Though the Company exerts encouragement towards standardization, a wide latitude of choice is still present. Rods are produced in sizes from 15/16" to 3 1/4" dia. and from 17 1/2" to 80 7/16" long, each tapered on its small end. They are used in pumps operating at 800 to 2500 p.s.i. Valve seats are 100 per cent tested. Pistons get liner checks after 100 per cent production inspection. One of the regular Mission items is a line of high pressure plug valves used in

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**W**ITH the Turchan Hydraulic Duplicating Attachment above illustrated, the movements of the great mass of weight in the carriage and cross-slide are not controlled by the tracer. All that the tracer controls is the slides holding the tools, thereby insuring greater accuracy and ease of operation. As

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*Turchan*

## FOLLOWER MACHINE

ANY STANDARD MACHINE IN YOUR PLANT  
CAN BE TURCHAN-EQUIPPED



"Christmas tree" pipe manifolding to control oil flow from wells.

Mission has adapted methods for straight-line, mass production flow to small lot production. This is a notable achievement. Machines are grouped within defined shop areas to produce each particular component completely. Materials handling and routing are efficient. There are touches of human appeal throughout shop practice; for example, a coffee cart makes regular rounds to machine side. Mission is doing considerable experimental engineering. I noticed a screened set-up covering experimentation and pilot operations on a centrifugal pump being developed for chemical and specialized industrial uses, using special alloys.

All Mission products require heat treatment, many of them receive plating. There are five retort-type, gas fired carburizing furnaces for rods, using special quench involving 700 gal./min. recirculating oil flow. These rod ends are drawn in a lead bath and quenched in water. All heat treat is gas fired, with automatic L & N control, Figure 1. Perleton batch type liquid carburizing is used on plates for pistons. Mission has a considerable battery of

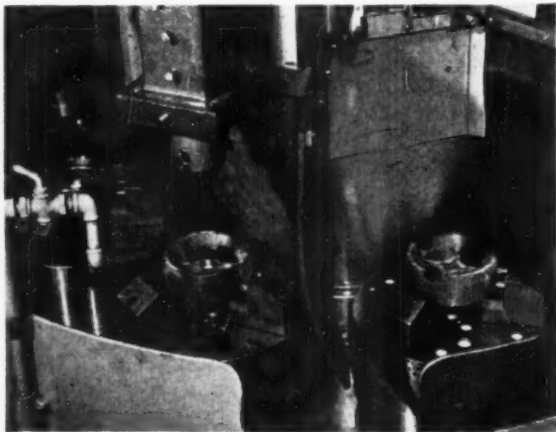
box type carburizing and batch type hardening furnaces, Lindberg Super cyclones and Mahr furnaces with special practises in both oil and water quench. There is much selective carburizing by copper plate masking and commercial stop offs.

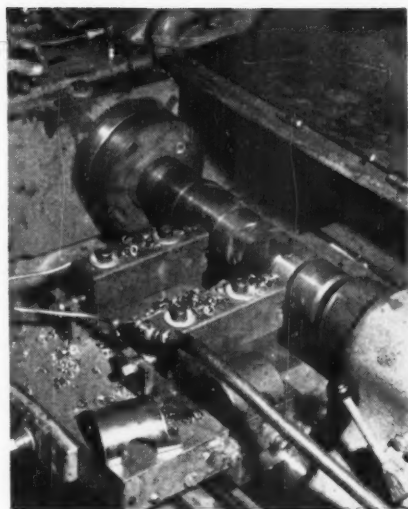
During the war, Mission had a considerable plating activity involving plating gun barrels and air frame struts. It manufactured much radar equipment, torpedo tubes and assorted gun mount parts for both British and American Navies.

Among examples of advanced machining practise, the mill, bore and face of an 8" valve seat on an 8-spindle 16" automatic Bullard interested me, Figure 2. This used standard chuck, special jaws of Mission design, carbide cutters. The shop produces its own standard and special carbide tools, having a complete set-up for this. It also produces its own jigs, fixtures and designs many special adaptions. Its tool room has seven tool makers, particularly skilled in rebuilding machines, in that Mission is far away from machine tool plants.

On the 8-spindle Bullard, one spindle is used to load, 6 spindles turned 131 rpm., one has 181 rpm. speed. Four

Fig. 2. Machining of slush pump valve seats on 8 spindle, 16" Bullard Mult-Au-Matic, showing special jaws. Removable pins and pads provide flexibility so that five sizes of seats can be accommodated.





**Fig. 3. Carbide turning of plug valve core halves on a Gisholt No. 12 automatic. High pressure air is used as a coolant.**

spindles have .006" feed, one show .013" feed. There is one unusual forming cut involved,  $1\frac{1}{8}$ " wide with  $41^\circ$  bevel and face, angle held to  $\frac{1}{2}^\circ$ , depth .010".

Mission produces six sizes of plug valve core with full openings to accommodate various pipe sizes of valves. In turning these on a No. 12 Gisholt automatic, a special Mission holding fixture which differs for each size is used: The work receives prior drilling and reaming to locate holding holes, and prior milling on the flat surface. This gives the work precision location, Figure 3.

The metal is alloy steel, normalized. The part is a half cylinder. The job is to turn the o.d., locating from the milled flat surface. The fixture receives two parts simultaneously, spaced  $180^\circ$  for steady load. The fixture has flat surfaces machined down to center line

to receive the milled flat surfaces on the piece.

Negative rake is used. There is  $7^\circ$  back rake, double side rake,  $-7^\circ$  land with  $15^\circ$  secondary positive rake; the set-up being similar to hyper milling. Positive secondary rake is to reduce the hp. The work receives an interrupted cut at 475 f.p.m. speed and .010" feed, using a high pressure (100 p.s.i.) air jet on cutter tips to keep them cool. Mission engineers tried this operation dry and tips burned up. In soluble oil, excessive tool chipping resulted. Air cooling works like hyper milling. Work comes off cool unless the tool is dull. All heat is in the shavings. Their character is hot, curled and with nice shine on the back.

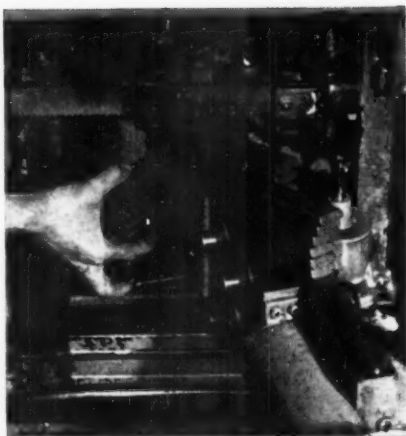
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**Fig. 4. Carbide turning of slush pump piston rods on a 4" Lo-Swing lathe. Carriage nearest tailstock is chamfering, undercutting, and knurling, while other carriage is turning O. D. for entire length.**



Piston rod sections are of hot rolled, metallurgically balanced alloy, roughly equivalent to the SAE 5100 series, having 142,000 — 150,000 p.s.i. tensile and achieving file hard case without drawing below Rockwell C60-C62 range. Material is first sawed to length from bar stock, — 1/64" tolerance and centered. It receives identification numbers in wide range. It is then turned on a 4 Lo-Swing Seneca lathe, Figure 4. One carriage with a follow rest turns the long cylinder body of the rod while the operator runs the other carriage in a second operation. The latter undercuts the rod runout and stress relief section, knurls that section, gives radius to the end, all in this supplemental operation. The entire operation is at 250 f.p.m. speed with .030" feed. Commercial knurling tools won't stand strains of this speed. A special 3" HS steel tool is used, using double mounted roller bearings. This change in tooling has resulted in amazing tool savings (better than \$20/day) and tools are lasting better than six months. After initial operation, the rod is reversed and its unturned section (previously gripped by the Seneca driver) is finished. The rod is then ready for grinding on a Cincinnati No. 3 centerless, after which it is heat treated. Subsequent operations provide the taper and threads. All tools are single point carbide in all possible operations. Wherever carbide has not been used, it has been tried.

Production of inserts for Mission slips, known as "dogs", represent neat machining. Mission makes the famed Rolling Dog slip for fast, safe, economical running and pulling of pipe. These "dog" components are dropped into the face of the slip and become the teeth which grip the pipe. They have a dovetail shape to fit the dovetail slot of the slip. The dog stock is received in cold drawn, special rectangular shape 12' bars with radii of the two corners in opposition. Stock is SAE x1020 fine



**Fig. 5. Blanks for pipe-supporting slip "dogs", or inserts, are sawed on a Peerless saw. Pneumatic feed shoves stacked stock against adjustable stop. Material is first cut in double lengths, then clamped against side to be sawed in half simultaneously with sawing of doubles.**

grain steel. A Mission designed special rigging double cuts these blanks in 10-high gangs.

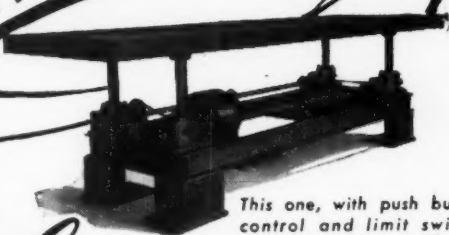
A standard Peerless Universal saw is accommodated by a 14' bar support and an air jack to feed the bars, stacked 10-high, Figure 5. Work moves along the bar support, automatically fed forward against a mike stop. A double cut is made. Previous cut is inverted and placed against the mike stop in opposition. An air clamp lever operates a vise having equalizer jaws which clamp the bar stock in with the previous cut for double positioning. Two air-operated hold-down clamps with equalizer are operated by the same lever to clamp the bar stock and the double on each side of the saw blades. These are timed by orifices so that all three air clamps operate in proper sequence. The cut is started. During the cut, the operator gages all 20 pieces of the previous double cut, burrs and stamps both ends of

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Fig. 6. Milling of slip "dogs" on a Milwaukee Simplex. Cutter nearest machine column climb mills circular profile; parts are transferred to other fixture, where form cutter conventional mills serrations.

all. Dial gage is used. Limits are .020" length.

There are a variety of slip styles. The regular rotary one-piece slip has

three segments, each of which has an inserted section of dogs installed against a back plate and held by a rocker, pin and spring. So each slip has a considerable complement of serrate dogs and these in a variation of sizes which all adds up to quite a complicated production problem. Mission has solved this neatly in gang milling by a horizontal and vertical machining set-up, Figure 6.

As previously described, the blanks come from the saw in series of 10. They receive a horizontal milling in a double operation which uses two special holding vises; one solid and the other adjustable as to height. This work is on a Milwaukee Simplex 12-24. Radius is roughed out, as much as 3 cu. in. of metal per inch of feed being removed on the larger pieces. The run here is at 50'/min., 4" feed. The parts, milled in gangs of 10, are then transferred to the second holding clamp for finish milling in which the radius is brought to size and serrated. Work then moves along to vertical milling on a rotary table, using a No. 3 Milwaukee Vertical. Here a double fixture is used, the operator loading one as the other is being milled. The worked is stacked 4-high. Using a 2 1/2" cutter, at 120 f.p.m. speed and 6 1/4" feed, the straight cutter has teeth 5-high around the arbor, staggered to break the cut and shavings up. After completion of this operation, dogs are carburized, hardened, deburred by shot blast. This entire procedure is unique in its high production, high variety set-up, illustrating the principle of mass production for small lot rushes. Tooling is universal and completely adaptable. Set-ups and schedules can be swiftly changed. THE END.

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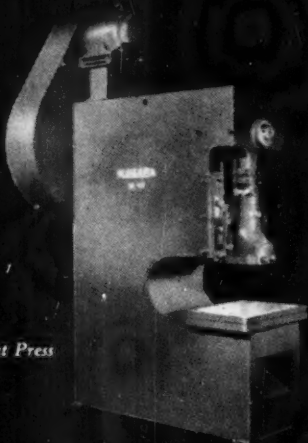


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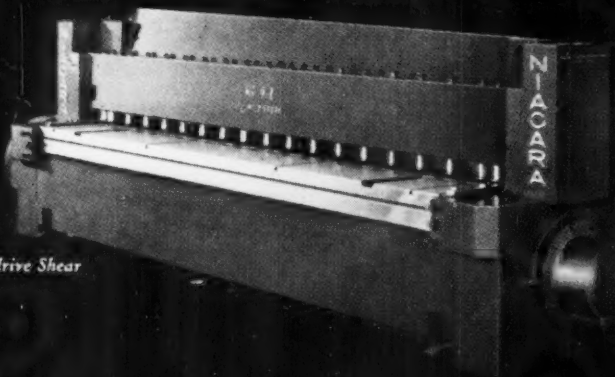
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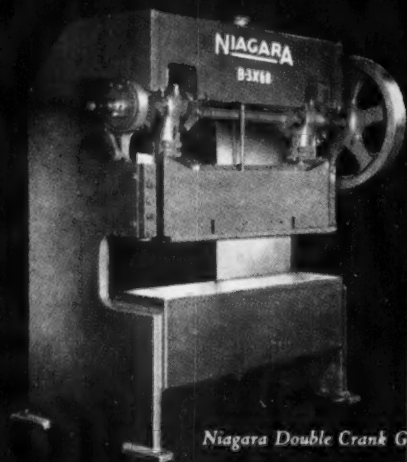
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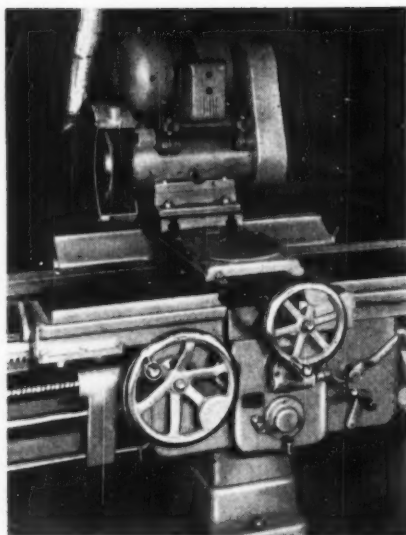
# *Heavy Duty Engine Lathes*

The machine tool industry has developed engine lathes for the re-surfacing of rubber rollers used in the printing industry. Two of these lathes, produced by the LeBlond Machine Tool Co., are in use at the Crowell-Collier Publishing Co. Principles involved in the grinding of rubber rollers, as well as a description of the tools used for this purpose, are discussed.

**M**ANY of the leading printers, publishers, and paper mills are finding it economical to re-surface in their own plants the rubber rollers used on printing presses of all kinds. In addition to substantial savings in maintenance costs effected by setting up and operating on-the-spot roll grinding and polishing facilities, the individual members of the graphic arts industry have discovered they can reduce their inventory of rubber rolls and can exercise better control over printing schedules.

It is interesting to note that the machine tool industry has been called upon to provide the tools for this highly specialized work. One company in particular—the R. K. LeBlond Machine Tool Co., has been active in advancing the technique of roll grinding.

A large and a small lathe have been developed for this purpose. The smaller, the Regal roll grinding lathe, is a 19" (raised) x 150" light pattern engine lathe equipped with a 2-horsepower grinder. It will accommodate rolls 3" to 9" in diameter. The larger is a 25" x 120" heavy duty lathe, utilizing a 5-horsepower LeBlond-designed grinding unit. It will accommodate rolls of 13" maximum diameter.



**Fig. 1. A heavy duty roll grinding lathe installed in the main press roll department, Crowell-Collier Publishing Co., Springfield, O. The heavy duty 5 h.p. grinding unit is mounted on a special carriage and slide.**

• • •

The principle involved in both types of roll grinders is practically the same. A special grinding unit, mounted on the cross slide of the lathe and rotated counter-clockwise, is fed into the roll which is revolved in the opposite direction. This extremely high speed grinding action permits fast, heavy stock removal and produces a very smooth finish on the roll.

Both roll grinders are dual purpose lathes and can be used for rubber roll grinding and for standard metal turning.

The 25" heavy duty roll grinder has a center distance capacity of 120", and a swing capacity of 27½" over the ways and 13" over the special carriage and slide. Rolls are held by their own steel

cores in two 3-jaw steel-body chucks, one each in headstock and tailstock spindles. A special revolving spindle tailstock is used to facilitate rotation of the tailstock chuck.

The special 5-horsepower grinding unit, figure 1, mounted on a heavy carriage and cross slide, was designed and produced by LeBlond. Power is transmitted from the motor by four vee-belts which revolve the 14" x 2" grinding wheel at 1640 revolutions per minute. Dust from rubber rolls is removed by a special telescoping sheet metal suction tube which permits the carriage to be moved in either direction within its 120" center distance capacity.

Ample power for substantial stock removal is assured by means of the 10-horsepower main drive motor which drives the headstock chuck.

The headstock of the heavy duty offers 16 spindle speeds in optional ranges of 6.5 to 400 revolutions per minute, or 10 to 600 revolutions per minute. All high speed gears are hardened and ground. The quick change box is totally enclosed and lubricated automatically. The carriage travels on hardened and ground steel bed ways which are replaceable and virtually self-lubricating. The apron is of the patented one-piece construction with single lever control and with positive jaw feed clutch.

One of the LeBlond heavy duty roll grinders was recently purchased by the Crowell-Collier Publishing Co., Inc., publishers of COLLIERS, WOMAN'S HOME COMPANION, and AMERICAN MAGAZINE. It is believed the new 25" lathe will provide the close precision, high speed rubber roll grinding required by this Springfield, Ohio publisher.

The Crowell-Collier roll maintenance department, said to be the only complete one of its kind in the industry, is responsible for re-surfacing all rubber rollers used on dozens of high speed presses. This involves grinding to ex-



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"No EXCUSE for file abuse," says Pop the foreman.

The proper use and care of files enter heavily into savings in *man-hours, materials* and *new-file costs*. Here are some timely suggestions worth posting in tool-rooms, on shop bulletin boards, and over workbenches:

- Don't throw files among other tools or objects.
- Don't lay files on top of, or stack them against, one another. Keep them sepa-

rate--either standing with tangs in holes, or hung on racks by their handles.

- Keep files in a dry place, so rust will not corrode their cutting edges.
- Keep files clean of filings. Tap file frequently on wood (not on metal) to loosen chips. Also brush with file brush or "card."
- Don't put too much pressure on the forward, or cutting, stroke.
- Never "drag" file back under needless pressure.
- Use The right file for the job.

**HOW TO USE AND CARE FOR FILES** is elaborately covered in Nicholson's famous 48-page illustrated book, "FILE PHILOSOPHY." How many copies for "key" uses shall we send you? FREE.

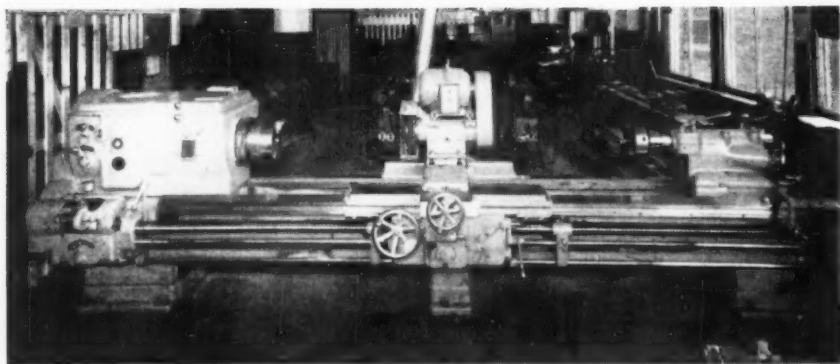


NICHOLSON FILE CO., 16 Acorn St., Providence 1, R. I.

(In Canada, Port Hope, Ont.)



# NICHOLSON FILES FOR EVERY PURPOSE



**Fig. 2.** Dust from rubber rolls is removed by a special telescoping sheet metal tube which permits carriage to be moved in either direction within its 120" center distance capacity.

• • •

tremely close tolerances a large volume of rubber rollers of many different sizes and five different types of composition, figure 2.

Quality of workmanship is the primary consideration in roll maintenance, according to Crowell-Collier officials, but speed is also an important factor where so many presses must be kept in

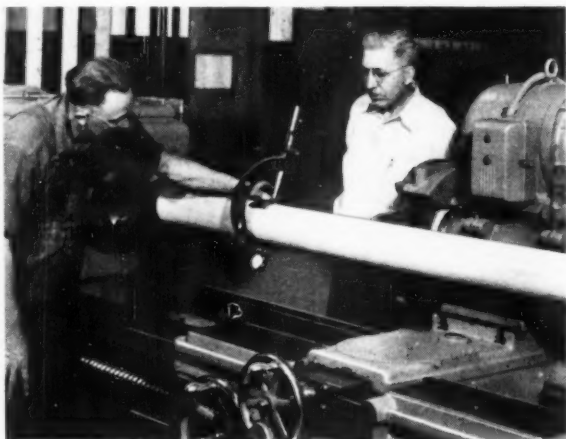
good condition to meet publication schedules. The company operates both letterpress and rotogravure presses at the rate of 20,000 impressions per hour, 24 hours daily, with time out only for changes and occasional adjustment.

This publisher's roll maintenance department is completely equipped with a wide variety of special design machine

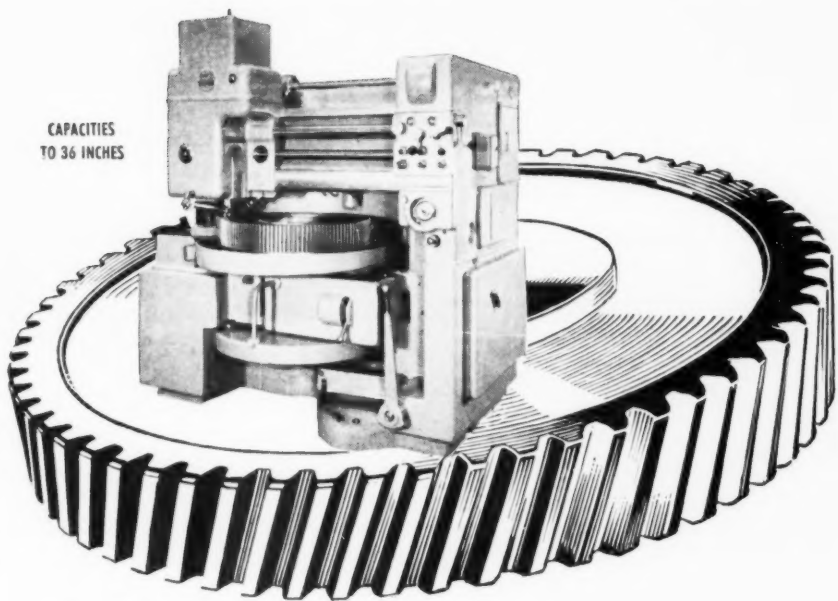
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**Fig. 3.** Special instruments are required for measuring outside diameter of rubber rolls. Operator and Mr. E. E. Stowe, foreman of the main press roll department, are shown checking a roll.

• • •



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tools for grinding, polishing, and sanding, and has been developed progressively for the last 25 years. The same standards of accuracy employed in the metal working industry are observed, but since the substance being turned is rubber, special measuring instruments have been developed for guidance of machine tool operators, as shown in figure 3.

The second type of roll grinding lathe manufactured by LeBlond is the Regal

which is intended for resurfacing smaller, lighter rubber printing rolls.

Aside from the capacity involved, the principle differences between these two types of roll grinders is that the Regal requires an auxiliary motor, and the method of suspending the rolls in the lathe is different in each case.

On the Regal, the roll is held in special steady rests by its own journals (or core). The power is transmitted from the 1-horsepower motor mounted on top of headstock, through a variable speed pulley and vee-belts to the face plate, thence through a driving rod to the head-end journal of the roll.

The 2-horsepower main drive motor with which the Regal is furnished is intended for use only in normal metal working operations.

The 2-horsepower grinding unit mounted on the heavy cross slide whirls the 10" x 1" grinding wheel at 2325 revolutions per minute.

The Regal roll grinder has an 8-speed geared headstock which offers optional spindle speed ranges of 20 to 425 revolutions per minute, or 30 to 638 revolutions per minute. It is built with both leadscrew and feed rod, quick change feed box, and one-piece apron with positive jaw feed clutch and one-shot lubrication. Spindle start, stop, and reverse may be controlled either from apron or headstock.

For the last ten years Regal roll grinding lathes have been produced by LeBlond exclusively for one of the largest manufacturers of rubber printing rolls. These lathes were released last year for sale to the general trade. Several of them have since been installed in newspaper publishing plants, and a few paper mills are planning similar installations. The End.

**Diamond Tools** for all industrial purposes. Description and prices of line of diamond tools. All tools are set in Colmonoy. **Diamonds and Tools, Inc.**, 19345 John R St., Detroit, Mich

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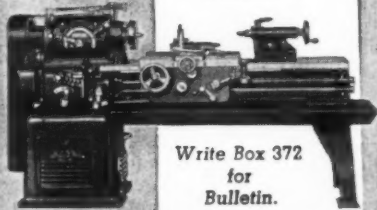
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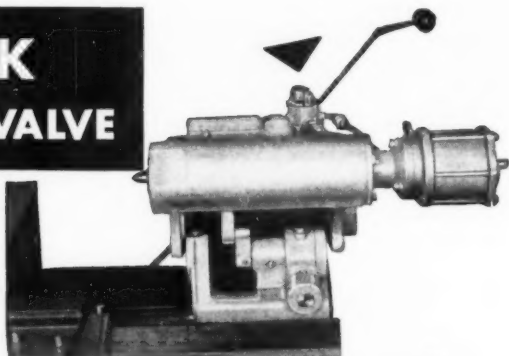
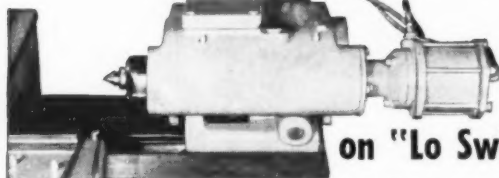
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# NOPAK DUAL 4-WAY VALVE

Tailstock in raised position at end of work cycle to provide easy clearance for work-piece.

Tailstock in normal operating position, with spindle advanced. Work-piece is not shown.



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on "Lo Swing" Automatic Lathe



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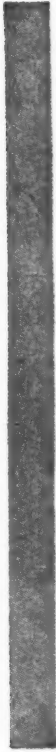
# NOPAK

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## FLAME SPINNING,

# *A New Metal-Forming Method*



Popular during the war, the flame spinning method of shaping tubes and tubular products, is winning wide acceptance today. A flame heats the part of the tube to be shaped, a forming tool then shapes the tube into desired shape.

ONE of the oldest methods of forming materials — the spinning process — has recently developed into one of the most popular methods of metal-forming.

Probably the idea of "spinning" was used first by the primitive potters to shape their plastic clay on a revolving "potter's wheel". By rotating the "wheel", and pressing his hand or finger against the spinning lump of clay, the potter found he could produce various circular shapes. Developing throughout the years, the method finally came to be adapted to shaping metals also, and for many years metal-fabricators used this method to shape articles from tubular stock. This same age-old principle of spinning, coupled with the idea of using the oxy-acetylene flame to heat and soften the work to be formed, has led to the development of an outstanding new method of shaping metals — the oxy-acetylene flame-spinning process.

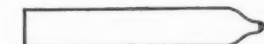
Developed by wartime necessity, this oxy-acetylene flame-spinning process for shaping tubes and tubular products has become an essential and permanent method of metal-forming and is being widely-used throughout industry. This spinning method is used also in many cases where the size and wall thickness of the tubing to be formed are so great that cold-forming is possible. It has the advantages of economy and speed, and, in some instances, makes it possible to

eliminate entirely joints in tubular members. It can be used for partially closing the ends of tubing, for making a complete closure, or for reducing diameters at any point.

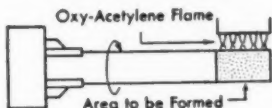
### How the Process Works

Fundamentally, the process consists of heating with an oxy-acetylene flame or flames that part of the tube which is to be shaped. During this heating the tube is rotated rapidly. As the forming temperature is reached, a tool is forced against the end of the tube, shaping it to the desired form. This forming heat is reached only a few seconds after the flames are applied to the work. The oxy-acetylene flames usually continue heating the work, keeping it pliable during the shaping action. When the shaping is completed, spinning is stopped and the tube is removed from the machine, completely shaped and ready for shipment. Flame-Spinning should not be confused with the so-called "bomb-spinning" process in which the work is first heated in a furnace and the oxy-acetylene flames are used during forming only to supplement this pre-heating. This process is used more for shaping large, heavy tubing — generally tubing of more than 4 inches in diameter or 3/16-in. wall thickness.

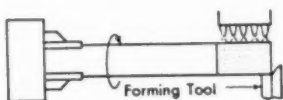
Flame-spinning now is being applied to tubing ranging in diameter from 1/2 to 4 in., but there appears to be no limit to the maximum or minimum diameter of tubing that may be spun. The only limiting factor in flame-spinning is that the ratio of tube diameter to wall thickness should be no greater



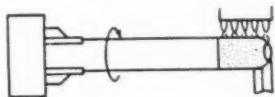
A part like this is to be made from stock tubing.



First, the tubing is fastened in a machine and spun rapidly while the oxy-acetylene flames heat the area to be formed.



Second, the forming tool is applied to the heated area of the spinning tube.



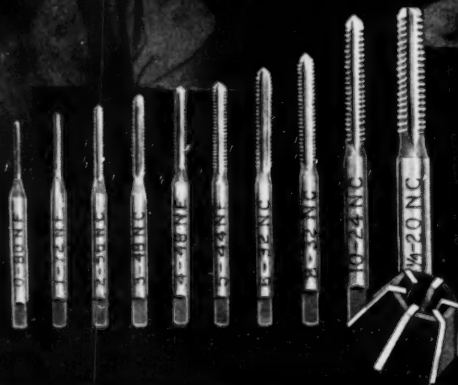
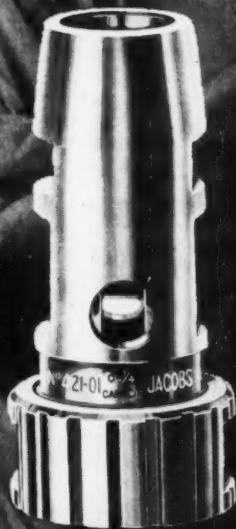
Third, forming is continued until the desired shape is reached—a matter of seconds.

than about 50 to 1. Experience has shown that tubes of a greater diameter-thickness ratio tend to deform under the forces involved in this operation.

### Mechanical Equipment

Machine requirements for a flame-spinning layout include a lathe, or similar heavy-base machine, incorporating the following features: (1) a rotary member with chuck, (2) forming tools and support, (3) oxy-acetylene heating heads and control equipment and (4) a timer. For many applications, a heating head with seven flames supplies sufficient heat. For work requiring the heating of larger areas, 17- and 30-flame heads are available. The number of flames in each heating

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Collet changing is a thing of the past when a Jacobs Rubber-Flex Tap Chuck holds the tool. *One chuck takes all the taps in its range without the necessity of changing sleeves or collets!* The Jacobs No. 421-01 Tap Chuck, for example, has a capacity from #0 machine screw taps to  $\frac{1}{4}$ " hand taps.

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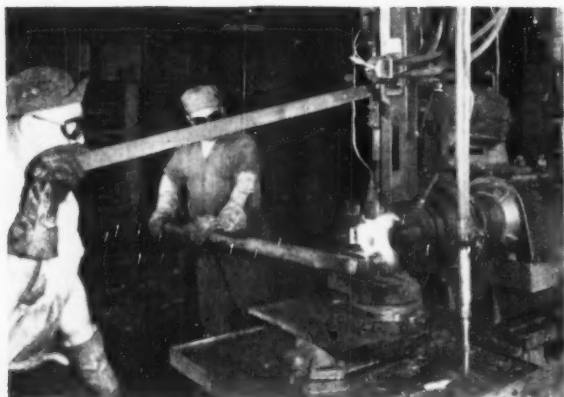
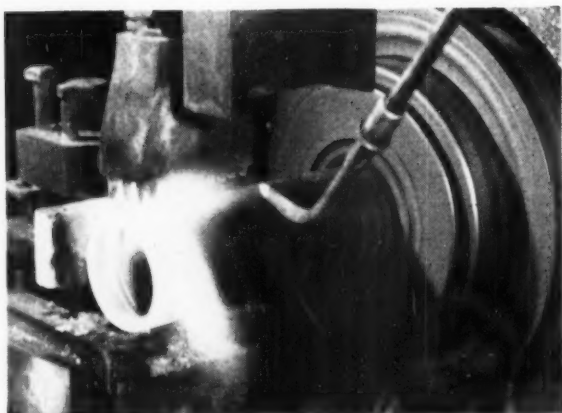


**Jacobs Chucks**

• • •

Fig. 2. Work being flame-spun reaches red heat quickly under the oxy-acetylene flames. The forming tool is at left. At right is a pilot light.

• • •



• • •

Fig. 3. Overall view of flame-spinning set-up. This heating operation is the first step in the end closure of tubing for chemical converters. The blowpipe is used in the secondary heating operation.

• • •

head can be varied to suit the special needs of the work by simply replacing the tips of the necessary flames with blanks. Forming tools are generally of either a roller, cam, or flat-plate design, depending on the nature of the forming job. They are usually surfaced with a heat and wear-resistant alloy, such as Haynes Stellite alloy, to improve wearing qualities under high-temperature work. For spinning standard tubing up to about 2 inches O. D., a motor of approximately 3 hp. is required to supply the rotative power, while for tubes of 3 to 4 inches in diameter, about 10 hp. is needed.

### Flame Spinning Converter Tubes

The flame-spinning process is naturally adapted to mass-production methods. It is being used to good advantage in many plants producing items for the automotive, chemical, refrigerating, air-conditioning, and other industries.

The use of flame-spinning in a typical production job — the fabrication of closed tubes for chemical converters — is illustrated in Figs. 2 - 4. The tubes, cut to size from 3-in., 12-gage mild steel tube stock, are closed at one end



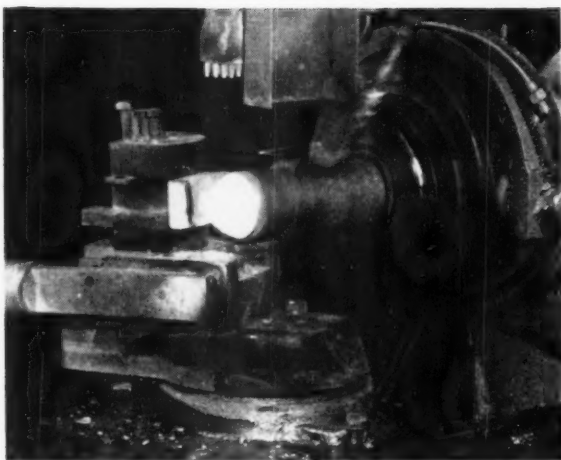


Fig. 4. When the work has reached forming heat, the flames are withdrawn and the shaping tool is forced against the work. Tube end is shown three - fourths closed.

with the oxy-acetylene flame - spinning setup in Fig. 2. The complete forming operation takes only 35 seconds — a fraction of the time taken for the

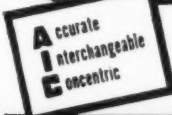
cold-forming method previously used. In this setup the blowpipe was fitted with a 30-flame rhomboid heating head, although only 9 orifices were needed for

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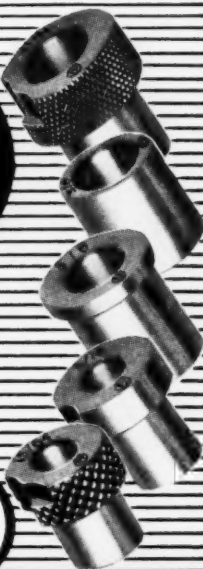
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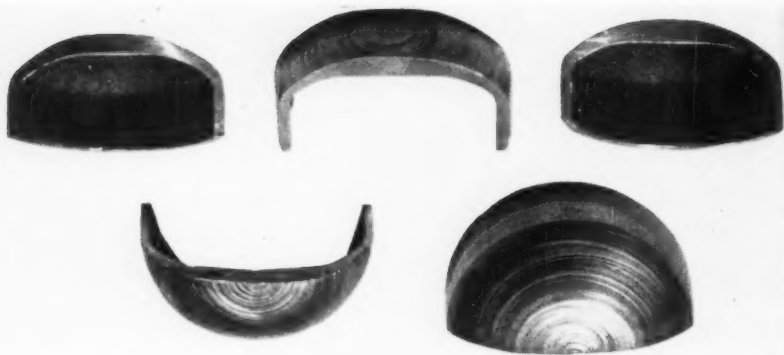


Fig. 5. Specimens of flame-turned products. Walls at the ends of tubes are thicker than the side walls.

• • •

this job. A forming tool of flat-plate design was used. When the tube end was sufficiently heated to permit forming, the flame head was raised, thus automatically shutting off the heating

flame. The closing of the tube end was then begun.

In closing the end of a tube completely, as in this operation, a secondary heating of the tube edges is applied just before the end is sealed. This heating prevents the trapping of impurities and gas pockets in the center where the metal is fused together. A strong, solid end section is thus formed. Test specimens show that the wall at the closed end of the tube is actually thicker and stronger than the side walls. Etched specimens reveal a very satisfactory crystalline structure in the worked area. The tubes are tested at a pressure of 1000 lbs. per sq. in., which is well above the working pressure. THE END.

(Photos and text courtesy of Linde Air Products Co., New York City.)

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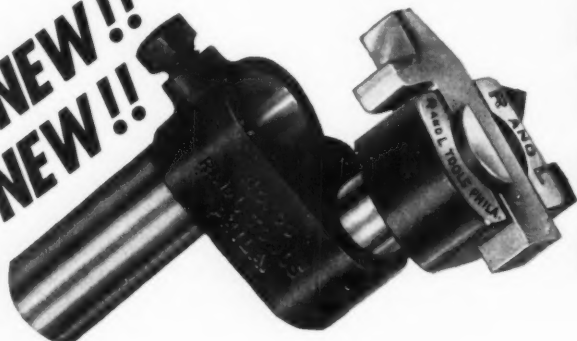
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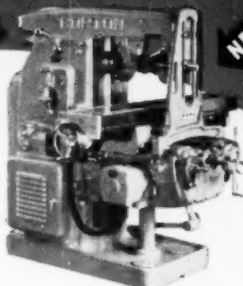
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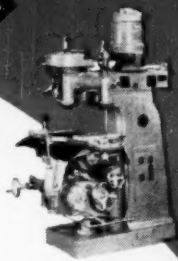
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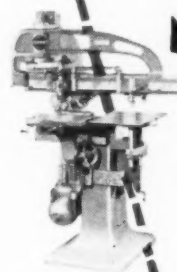
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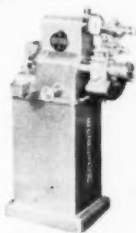


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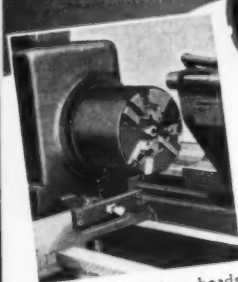
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# Letter from England



Written for the **MACHINE** and **TOOL BLUE BOOK** by Robert Hutcheson, Editor of **MACHINE SHOP MAGAZINE**, London, England.



In this country we are getting very safety conscious on our roads and one of the latest safety devices is a talking traffic signal which has been developed here by Speaking Signals Ltd., and embodies an E. M. I. tape recorder carrying the warning signal, the playing and transmission of which are synchronized with the changing of the usual coloured traffic lights. The apparatus is in the form of a unit which can be fixed to the standard of an existing traffic signal. A typical warning that can be uttered is that which is familiar to British school children, "Children, remember, look right, look left, look right again".

Considerable attention is being given today to the establishment of light industries in areas that were previously devoted only to heavy industry or which had very little industry and which were, in consequence, hit very badly in times of slumps. Certain areas of Scotland are being developed in this way and another step in this direction is the setting up of a factory on the Vale of Leven Industrial Estate near Loch Lomond by the Burrough's Adding Machine Company. Negotiations have been completed, says Mr. John S. Coleman, President of the Company, and the factory will occupy a good supply of labour. The Burrough's plant at Nottingham is engaged in the assembly of machines for export but the new factory will enable the Company to enlarge their pro-

duction activities considerably and make a greater volume of products available for export. The new plant is scheduled to come into operation this year and to reach full production in 1950.

Standardisation is going ahead in the aircraft industry in this country and the British Society of Aircraft Constructors has recently indicated the extent to which it has been carried. During the past 10 years between 5,000 and 6,000 parts have been standardized and these vary from simple things like rivets to complete assemblies such as pilot seats and rudder bars. In addition, the Society has developed a standardised drawing office system which is available to all aircraft companies in the country and it is claimed that this not only simplifies drawing office procedure but it also makes the exchange of draughtsmen between firms a much more efficient process.

As indicated in a previous letter the British Railways are also extending standardisation and it is anticipated that there will be only 12 classes of locomotive running on our lines in the future.

The most recent strike in the engineering industry is an unofficial one in four works around London owned by the de Havilland Engine Company. This started as a protest against the dismissal of an employee who



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objected to working whilst being watched by a time study man. This happened a week and a half ago and today 1,600 employees are out on strike with the threat of another 2,500 joining them in a one day token strike. This stoppage of work is delaying the execution of orders for jet engines to the value of £200,000 (\$800,000) intended for aircraft that will be exported. The engines in question are Goblins to be fitted into Vampire jet fighters. The strike is also holding up development work on the Ghost jet engine which is not yet in full production.

Prior to the war there were one or two companies in this country mass-producing furniture and were in fact building cheap furniture on engineering lines. The introduction of utility furniture has helped to extend this method of furniture making. Utility furniture was introduced by the Board of Trade and consists of standardised designs of comparatively plain furniture intended to be sold at controlled prices. Furniture making firms are allocated a certain amount of timber from which they are required to produce a definite amount of furniture. This means that there can be no wastage of wood in a furniture works and every effort is made to cut timber economically and in many instances, large panels are built up by the gluing together of comparatively narrow strips of wood. Some of the bigger firms have introduced conveyers and wherever possible machine work replaces hand-work. Dovetails for making of joints, for instance, are all machine cut and instead of the prismatic form that is cut by hand with a chisel, the male and female parts are milled and the result is a dovetail of conical instead of prismatic form. Assembly work and gluing parts together is all done in jigs, fitted with toggle-operated or air-operated clamps, and it is a point of pride with some of these furniture making firms that they do not employ a single cabinet maker, the planning and breaking down of the work into simple operations enabling them to employ unskilled labour.

Some time back the British radio industry was suffering something in the way of a slump, this was particularly noticeable in the sales of radio sets in the home market. However, on the industrial and large scale

side there was quite an export boom last year. Equipment for aiding navigation, industrial electronic equipment and radio communication apparatus was sold overseas to the value of more than £3,000,000 (\$12,000,000). The export target of the radio industry for 1949 is also £3,000,000 and one of their spokesmen considers that there should be no difficulty in doing this amount of business.

At the end of December 1948, there were 2,115,000 tons of shipping under construction in the United Kingdom, which was nearly 100,000 tons less than that at the end of the previous quarter. This was also below the tonnage under construction at the end of 1947. However, according to Lloyd's Register, there was an increase of ships being built abroad and the December figure stood at 2,026,000 tons. This decline in British yards is attributed to shortage of steel and so the shipbuilding industry may welcome the announcement made by Mr. Hector McNeil that there was to be a 5 per cent increase in steel allocations to this industry during the first quarter of 1949, although Mr.

McNeil did not promise that this increase would be maintained throughout the year.

The views of Sir William Goodenough, Chairman of Barclay's Bank, one of our largest banking organizations, must be shared by many of our industrialists. When making his annual statement he attributes many of the troubles in this country today to be the outcome of the setting aside of first principles, but he is pleased to see this is changing. He was commenting especially upon the deliberate restriction on the provision of new capital equipment and he said that our aim must be to devote a larger part of our national income to industrial development.

Touching again on shipbuilding, the General Secretary, Mr. E. J. Hill of the United Society of Boiler Makers and Iron and Steel Shipbuilders, has made out a case for nationalisation of the shipbuilding industry and it has been passed to the Labour Party for their consideration. This Trade Union is hoping that the nationalisation of shipbuilding will form part of the Labour Party's election programme in 1950.

IF YOU FAVOR

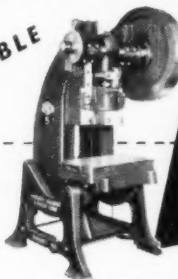
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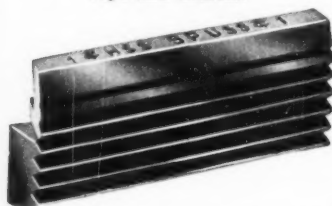
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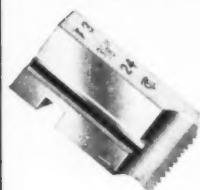
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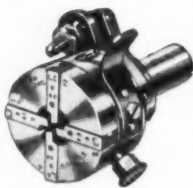


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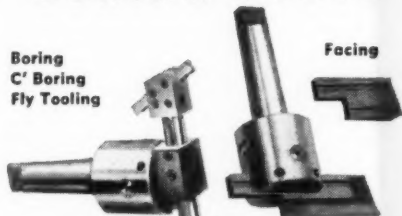
On the matter of ship repair work the Union considers that this should be nationalised only where it is carried out in shipbuilding yards, when the ship repair side should be acquired with the shipbuilding business. They do, however, regard ship repair work as being more the business of the shipping industry than of the shipbuilding industry and therefore they are not pressing for nationalisation of ship repair work as a whole. However, in the event of nationalisation of the shipbuilding industry, they would like to see the non-nationalised side of ship repair work operating under licence from the Ministry in order that it may be dovetailed into the plan of nationalisation.

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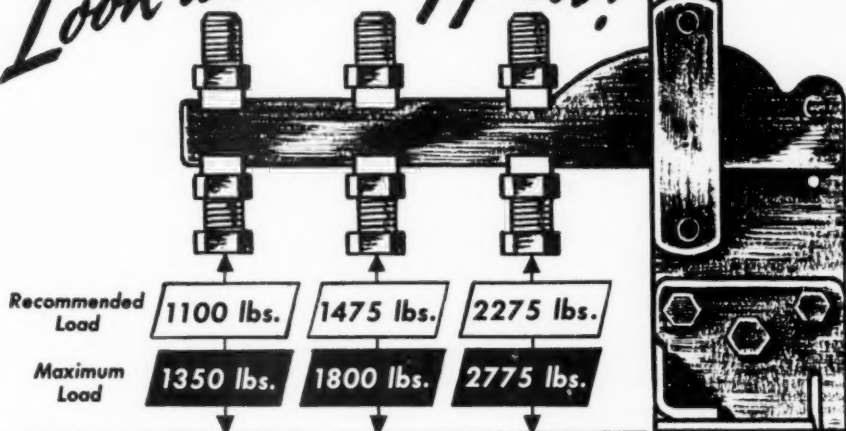
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Model S-1100 is used in this example. Similar variations in pressures are found in all other models. Every clamp has been laboratory tested.

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## A New Alpha Alumina Abrasive

For over a year many plants have obtained gratifying results with a new type of aluminum oxide abrasive developed by Norton Company of Worcester, Mass. The results in 24 grinding classifications indicate that this new product deserves to be rated as one of the more important abrasives developed by the grinding wheel industry.

This new product, known as 32 Alundum abrasive, has to a large degree both requisites which abrasive experts consider essential for an ideal abrasive. Its grains offer great resistance to point dulling, and they have the ability of fracturing under grinding pressure before serious dulling occurs.

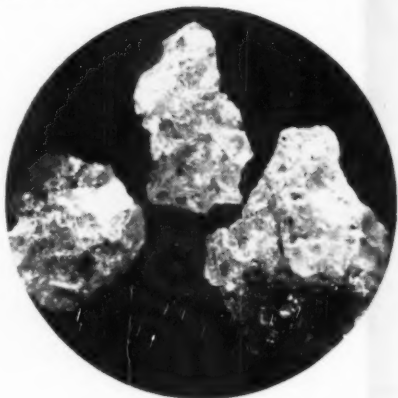
Unlike other manufactured abrasives, this new product is produced in the electric furnace as individual crystals. These crystals, ranging from 16 to 100 in grit size, are separated from the ingot without altering their original size or shape, and need only be dried and screened before being made into wheels. Their extremely nubby shape, retained from the time they are formed, is new and different from that of other abrasives, figure 1. This makes available

grinding wheels which cut very fast and cool, require a minimum of dressing, and have long life.

During the field tests, products made with the new abrasive were compared with standard products already established in most cases as the best for particular operations. The grinding wheels were rated for (1) coolness of

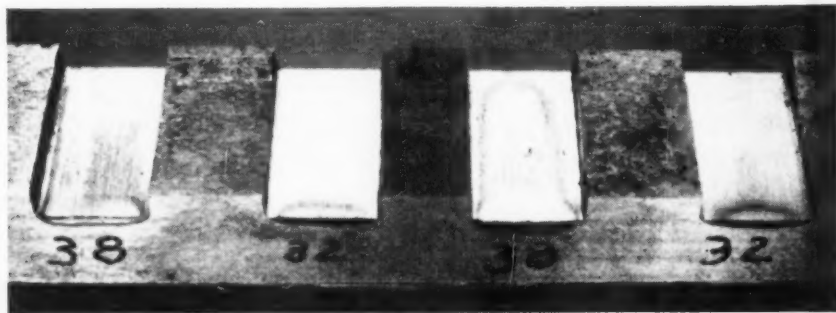
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Fig. 1. Photomicrograph of grains of 32 Alundum abrasive.



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Fig. 2. Bar of hardened steel with slots ground simultaneously by wheels of new 32 Alundum abrasive and conventional white abrasive. The cool cutting action of the former is visible.



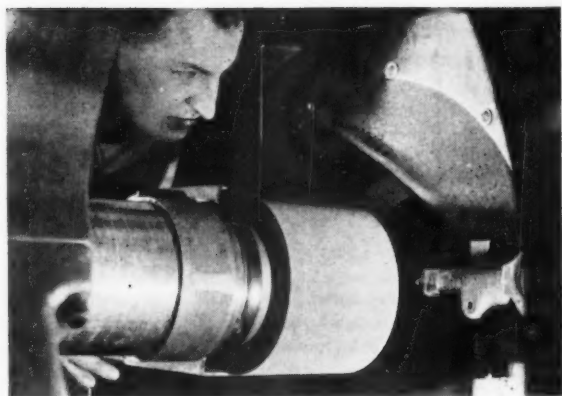
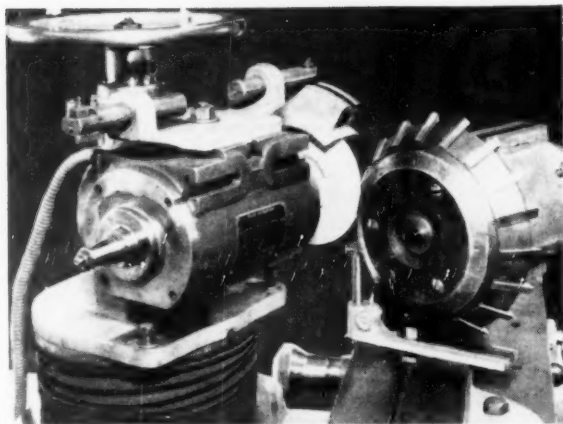


Fig. 3. A bearing manufacturer is grinding railroad bearing sleeves of hard SAE 52100 steel, 9" bore, 8" width, stock removal .070" to .080". On former wheels 8 or 9 dressings were necessary to grind one bearing. Alundum ground each bearing without dressing, although usual procedure is to dress once during roughing and again before the finish pass of .002".

Fig. 4. When grinding this 10" milling cutter (18 inserted teeth, each  $\frac{3}{8}$ " x  $1\frac{5}{8}$ ") previous tool wheel removed .002" per pass, burning a few teeth on the second revolution, and burning all teeth on the third. Alundum, removing .002" per pass, made six revolutions before signs of burning appeared.



cut, (2) rate of cut, (3) ability to stay sharp, and (4) length of life.

### Coolness of Cut

Three types of tests were used to rate coolness of cut. The first of these was based on the following theory. Over 99% of the power consumed in any grinding operation—the power transmitted to the wheel—is converted into heat. Therefore, the less power consumed, the cooler the cutting action. Two wheels of the same grain and grade, but of different abrasives, were

tested under identical conditions to surface-grind oil hardened steel. For the same amount of wheel wear, the new wheel consumed only 350 watts as compared with 480 watts used by the old wheel, or 73% as much power.

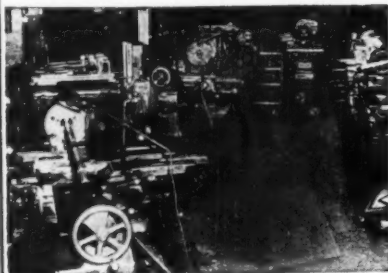
In the second test for coolness of cut, wheels of two different abrasives were used to grind slots from the solid in a bar of hardened steel, and this afforded a visual comparison of the cool cutting qualities of the two abrasives. Both wheels were mounted on the same spin-



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**GREASE & OIL RESISTANT**  
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**ADVANTAGES**

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**M.F.P.**

**(MACHINE SHOP  
FLOOR PATCH)**



dle, dressed alike, and run at the same surface speed and traverse rate. A very slow traverse rate was used (48 feet per minute) in order to cause both wheels to burn the work. Figure 2 offers evidence of the new abrasive's cool cutting qualities. Slots one and three, ground with the conventional white wheel show large burned areas, while slots two and four, ground with the new abrasive, show only slightly burned areas near the edges.

A third test involved recording temperature readings of the work being ground; results provided proof of the cool cutting qualities of the new abrasive. Obviously, a cooler cutting abrasive is desirable because it permits an increased rate of production without causing injury to the work.

**Rate of Cut**

Until the development of this new product, no other abrasive combined an extremely nubby surface with such a high degree of purity (over 99% pure alpha alumina). The high purity of this new alumina, plus its many sharply pointed nubs enable it to cut more readily, penetrate even the toughest alloy steels, and to cut freer and with less frictional drag to generate heat. Deeper, easier penetration of the metal permits greater depth of cut and reduces grinding time.

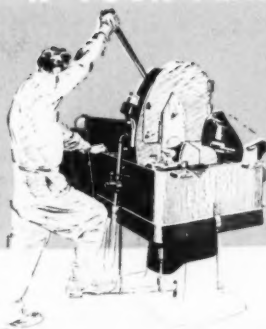
Two of the many tests with this new abrasive which serve as testimony to its faster rate of cut are given here.

In a surface grinding operation using a standard white wheel, steel was burned with a downfeed of .0005". It was necessary to reduce the downfeed to .00025" with a  $\frac{1}{2}$ " cross feed in order to prevent burning. When a wheel of the new abrasive was substituted for the white wheel, downfeed was increased to .002" with a  $\frac{1}{2}$ " cross feed. The new abrasive cut eight times faster and did not burn the work.

Another surface grinding operation involving a white wheel and high speed



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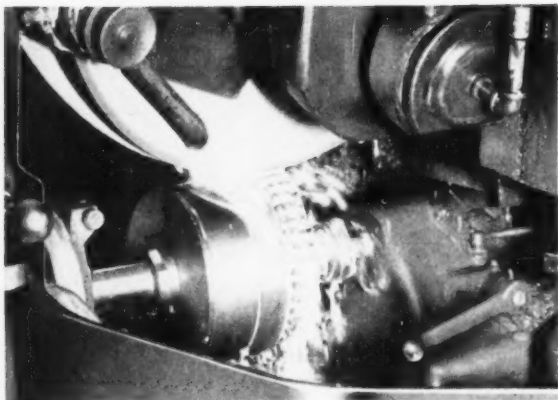


Fig. 5. Production time was cut 25% and wheel life lengthened by 25% on this grinding job.

steel was limited to .0005" downfeed and  $\frac{3}{4}$ " cross feed. A wheel of the new alpha alumina increased downfeed to .004" with  $\frac{3}{4}$ " cross feed—eight times faster cut without burn.

#### **Ability to Stay Sharp**

An abrasive which stays sharp longer reduces the appreciable cost of diamonds for truing, and is useful for handling difficult special purpose operations.

The outstanding results obtained with the new product on many different types of grinding operations verify the fact that this new abrasive does stay sharp longer.

No dressing was required for segments of the new abrasive during 89 hours of grinding on large hardened steel plates whereas the standard segments previously used required several dressings during 54 hours of grinding.

Wheels of the new product,  $\frac{3}{4}$ " in diameter and smaller, used for internal grinding, required no dressing for the life of the wheel. They ground straight holes more easily and quickly.

During the grinding of a sleeve of ball bearing steel, 9" bore, 8" width with a stock removal of .070"—.080", a standard wheel required eight or nine dressings, whereas a wheel of the new

alumina only required one dressing during the roughing and another before the finishing pass, figure 3. Other applications are figures 4 and 5.

#### **Wheel Life**

In order to obtain faster cutting action with the standard abrasives, a soft grade wheel is usually employed, which results in fast wheel break-down and short wheel life. When wheels of the new abrasives are used, it is not unusual to receive reports of long life accompanying faster or cooler cutting action. Many reports indicate that segments of the new alumina have two to four times longer life.

On a cylindrical grinding job a wheel of the new abrasive ground 28,000 refrigerator compressor eccentrics (hardened to 62 on the Rockwell C scale), as compared to 18,000 pieces ground with an ordinary wheel.

Segments of the new alumina saved one and one-half hours grinding time per block on a job involving the grinding of die blocks of vanadium steel. The new segments lasted six days in comparison with three days for the standard product, figure 6.

#### **A Versatile Abrasive**

This new abrasive was developed primarily to grind steels of high tensile

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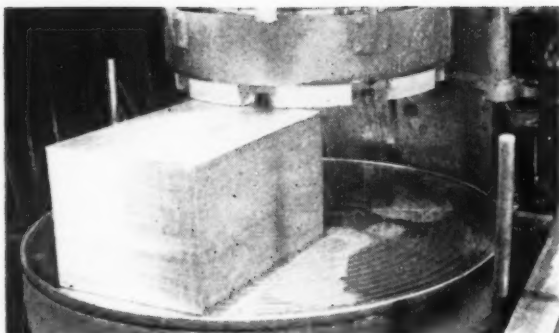


Fig. 6. Grinding time on these vanadium steel die blocks was cut 1 1/4 hrs. each and segment life was doubled with the new abrasive.

strength as well as to economically grind the new tool steels which are extremely tough and abrasive resistant. Surprisingly it has proved quite satisfactory for grinding some materials of low tensile strength such as cast iron, soft brass, ceramics, certain plastics, and rubber, previously ground with sili-

con carbide abrasives. This versatile quality makes it possible in many instances to grind with one wheel, parts which are made of two unlike materials.

Wheels of 32 Alundum abrasive are available in sizes ranging from tiny internal grinding wheels 1/4" in diameter to huge grinding wheels 60" in diameter for grinding farming equipment. They are manufactured in all standard thicknesses and are available with BE vitrified bond, any of the standard resinoid bonds, and in a wide range of structures including open structure for job requiring an exceptionally cool cutting action. Wheels of the new alumina are highly satisfactory for cylindrical, centerless, surface, internal, and tool grinding, and with resinoid bond they are excellent for snagging steel and alloy castings, forgings and welds. Many grinding operations once considered too difficult or too costly may now be handled quickly and economically with wheels of this new abrasive. **THE END.**

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Accuracy.*

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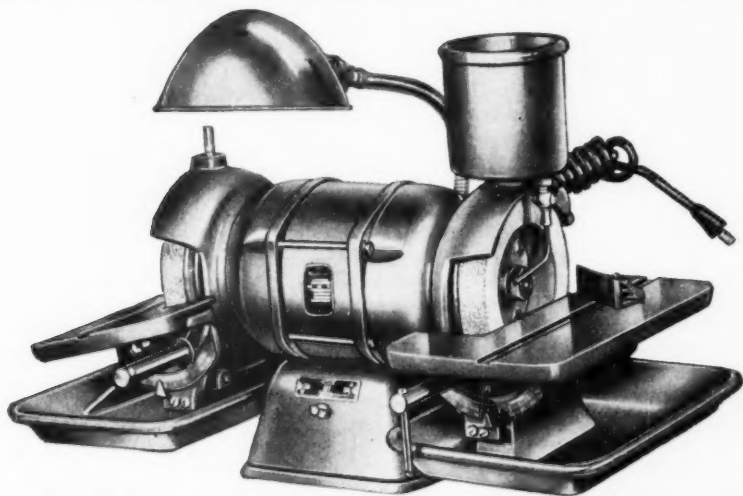
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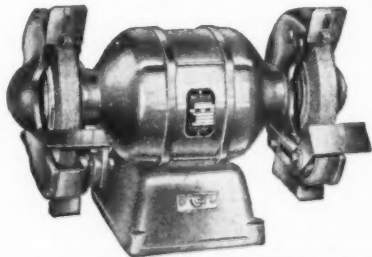


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BALDOR GRINDER, series 500, (shown above) is the newest development in grinders designed and fully equipped for sharpening Carbide Tools quickly and accurately; has sturdy  $\frac{1}{2}$  H.P., reversible, ball-bearing motor. 6" Silicon Carbide wheels; adjustable tool-rest tables, water pot. Complete as illustrated and GUARANTEED 2 YEARS against burn-out. **Price \$127.50**

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## New Welding Process Feeds Wire Through Welding Gun.

A new welding process, known as the "Aircomatic" process has been introduced by The Air Reduction Sales Co. It may be used for welding heavy sections of aluminum and aluminum alloys at wire feed speeds ranging from 100 to 300 inches per minute permitting deposition rates far exceeding those attained by usual welding methods.

A gas-shielded, metal arc method of welding, this new process consists of feeding a consumable wire through a manually operated welding "gun". The metals being welded are shielded from the air by an inert gas. It is anticipated that this sensational new process will have immediate and widespread application throughout industry. According to the manufacturer, the manual units are now coming off the production line and will be generally available by the end of this year. Automatic equip-

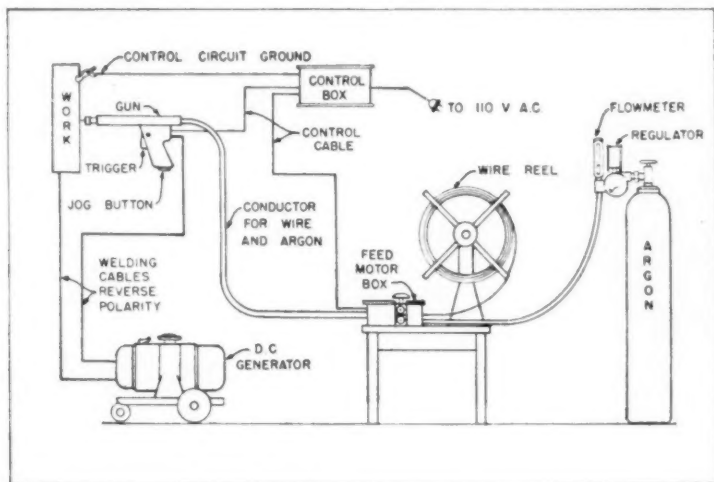
ment employing the same principles is also under development at this time.

The application of the process to metals other than aluminum and aluminum alloys is now under development in Air Reduction's research laboratory.

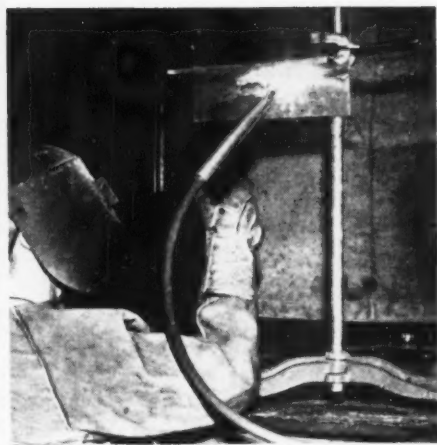
From an engineering point of view the problems surrounding this new approach have been many, involving new concepts of a combination of factors including current density, gas shielding and filler wire feed speeds.

Briefly, this new process involves feeding a consumable wire, which replaces the conventional non-consumable tungsten electrode, through the barrel of the welding gun. This filler metal carries welding current and an arc is maintained between the end of the wire and the work. Power is supplied from a standard d. c. welding generator.

With the Aircomatic unit, welding of aluminum may be performed in all



SCHEMATIC DIAGRAM OF EQUIPMENT FOR INERT GAS METAL ARC WELDING OF ALUMINUM



The wire is fed to the work through the barrel of a welding gun. The filler metal carries welding current and an arc is maintained between the end of the wire and the work. Power is supplied from a standard d-c welding generator and argon is used as the shielding gas.

• • •

welding wire, a three-conductor control cable, feed motor box, control box and wire reel.

The welding "gun", which resembles an automatic pistol, is equipped with a trigger which readies the unit for welding and a "jog button" for feeding wire when not welding. To start welding, the trigger is depressed. It can be locked in the "on" position by means of a button. This starts the flow of shielding gas. Next, the electrode, which should project  $\frac{1}{2}$  to  $\frac{3}{4}$  inch from the gas nozzle (hence the "jog button"), is scratched on the work. When arc voltage is established, the controls operate to energize the feed motor and deliver filler metal. The diagram illustrated shows the general paths of the argon shielding gas and welding current.

For welding, the gun is held so that it points ahead in the direction of welding. To terminate a weld when no welding current contactor is used, the arc is easily broken with a quick snap. If a contactor is used in the circuit, the operator need only release the locked trigger.

#### WELDING MARINE BULL GEAR

Shown being fabricated at the Sunnysvale, Cal. Works of Westinghouse Electric Corp., this seven and one-half ton "bull gear" is one of two similar gears to drive a large, marine ore carrier. The two gears are in the final stage of a series of gears taking the full load of a 7,000-horsepower marine turbine propulsion unit and reducing the speed from 6,000 rpm to 100 rpm for the propeller shaft.

The hub is being welded to the

positions, namely flat, horizontal, vertical and overhead. All of the standard joint designs may be welded in these positions. All the facility associated with metal arc welding of steel is made available by this process, plus the advantages of a high deposition rate resulting is continuous filler metal feed and the absence of slag.

According to Air Reduction, as far as it is now known, this is the first time that continuous wire feed has been employed for practical welding in the vertical and overhead position.

Argon has been found to be a satisfactory shielding gas for aluminum welding. The welding grade of argon currently supplied for Heliwelding is suitable.

For the welding of aluminum, as currently provided in this process, only three sizes of filler metal are needed,  $\frac{3}{64}$ ",  $\frac{1}{16}$ " and  $\frac{3}{32}$ ". With these filler metal sizes the overall current range is 70-90 amperes which permits welding of metal thicknesses from  $\frac{1}{8}$ " up to 2" and more.

The component parts of the Air-comatic unit are the welding "gun", gas (argon) hose, concentric with which is the metallic tube for conveying the



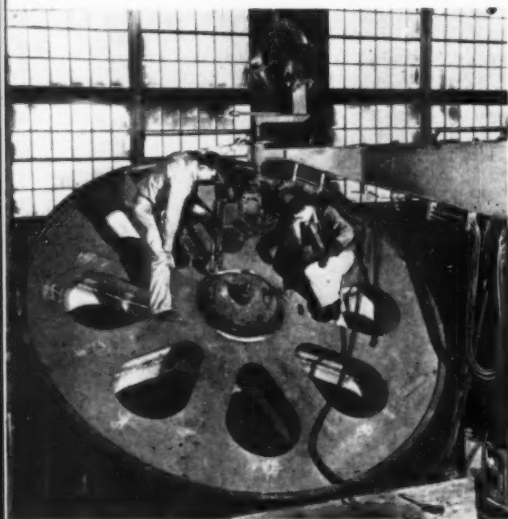


Figure 1. One of two large bull gear wheels to drive a ship's propeller shaft is shown in the welding shop. The wheel turns slowly under the Unionmelt weld-machine as the hub is being welded to the centerpiece.

• • •

centerpiece that forms one side of the wheel in Fig. 1. Flux is fed automatically as the wheel turns slowly under the welding machine. In Fig. 2 the rim is being welded to the wheel.

Two kinds of steel go into this bull gear wheel. The rim is of high-carbon steel to be hobbled later into 693 helical teeth that must later withstand great pressures under continuous operation. The remainder — hub, centerplates, and ribs — is made from mild or medium carbon steel.

Despite the size and ruggedness, each bull gear must be made to extremely close tolerances for such massive equipment. When completed and installed in a ship, they must operate trouble free for many years. Since the slightest inaccuracy in the gear teeth will cause

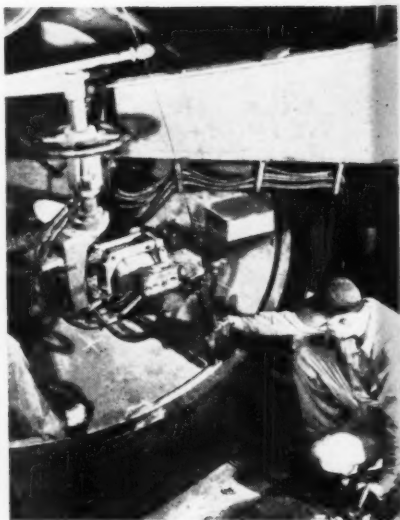


Figure 2. In this close-up of the fabrication of a large "bull gear" for marine propulsion at the Sunnyvale, Cal. plant of the Westinghouse Electric Corp., the rim is being welded to the wheel. The worker at right keeps constant check on adjustment of the welding apparatus. The man at the left is removing excess sand with a suction hose. Hidden by the welding machine wheel are the torches that keep the rim heated during the weld.

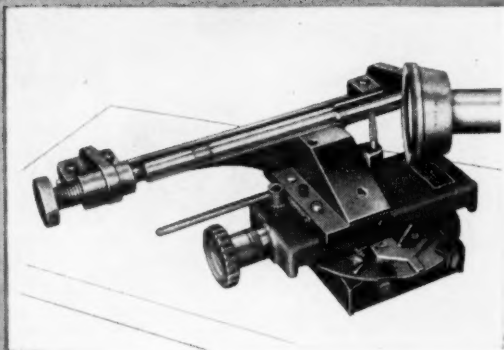
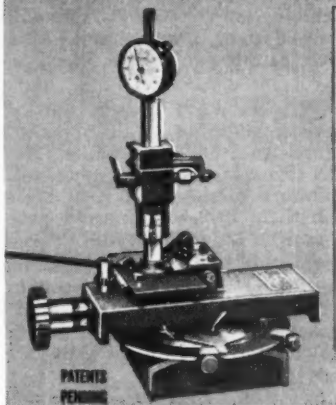
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excessive vibration and noise in the ship, inspection is rigid. Any imperfection, however small, will cause rejection. Tolerances for the helical teeth cut in the rim are as close as one ten-thousandth of an inch.

---

**Tool Holders.** Boring and internal threading tool holders shown were designed to accommodate complete line of boring and threading tools made by Bokum. Description, drawings, photos, 4 pages. **Bokum Tool Co., Dept. BB, 14475 Wildemere Ave., Detroit 21, Mich.**

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## MANY U. S. BUYERS EXPECTED AT BRITISH INDUSTRIES FAIR

Hundreds of American buyers will soon be receiving their invitations to the world's largest trade exhibition, the British Industries Fair. Last year 200 U.S. buyers made the journey across the Atlantic to the Fair and more than twice this number of British representatives of U.S. firms also attended. More than 3,000 firms are preparing their exhibits for the fair, which will be held at Olympia, London, and Castle Bromwich, Birmingham, from May 2 to 13, 1949.

No secrets are more closely guarded than those concerning goods regarded as the highlights of the exhibits. Not until the turnstiles begin to click will the exhibitors disclose the new ideas on which their 1949-50 sales and production policies have been built.

Since the last fair, British industrial producers have had a year's straight run unimpeded by fuel or financial crises or major labor disputes. It has been an unusually fruitful year for technical achievement.

Exhibits in the field of engineering and metals will constitute one of the most important phases of the fair. Enrichment of the air-blast with extra oxygen, and injection of oxygen into the molten bath, are still in the experimental stages in steel making. During 1948 Britain's steel industry has made long strides towards perfecting this technique. Five plants are conducting trials of the method, which is claimed to speed up the process and produce better steel.

What are described as "nodular" cast irons, which contain cerium, have been developed by the British Cast Iron Research Association. A tensile strength comparable with that of malleable cast iron is claimed.

Largest of all the sections at the Fair judged by the number of exhibitors (423) and second only to the textiles and clothing section in area, the section devoted to engineering metals, transport and gas is located, as usual, at Castle Bromwich, Birmingham.

# KRW PRESSES *help build* BETTER LAWN MOWERS

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## New Cold Finished Carbon Steel Bars Replace Higher Cost Alloy Steels.

Commercial use of Electreat cold finished carbon steel bars to replace higher cost alloy steels is reported by Jones & Laughlin Steel Corp. Electreat is heat treated by special electric induction equipment before it is sent to machine shops for manufacture into finished products. J & L is the first steel manufacturer to adopt this process commercially on full length cold finished bars.

Lundberg Screw Products Co., Lansing, Mich., is using Electreat bars where specifications permit, to replace more expensive chrome-molybdenum alloy steel and chrome-nickle-molybdenum alloy steel in the manufacture of certain studs for automotive and farm machinery; moreover, use of Electreat has enabled Lundberg to eliminate heat treating of these studs after they are machined. This means studs of greater uniformity and smoother finish are produced at lower operating cost.

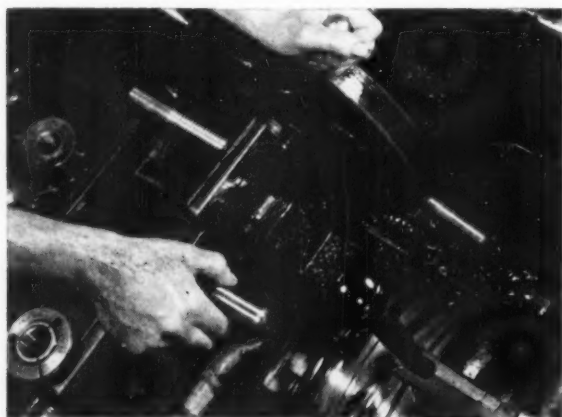
Considering the price factor, success of the Lundberg application of lower cost Electreat opens a vast new field of

possibilities for manufacturers of screw machine products.

Formerly Lundberg used chrome-molybdenum and chrome-nickel alloy exclusively to produce certain types of studs with specified hardness requirements for automotive and farm equipment machinery. After machining, these studs were heat treated by neutral salt pot hardening, oil quenched, and tempered to the desired physical properties. These expensive alloys are still used when specified by Lundberg's customers. Early trial runs showed Lundberg that the less expensive Electreat can meet the physical specifications for some alloy studs.

On the basis of the tests, certain studs for truck axles and transmissions and certain parts on farm tractors and combines are made of Electreat — SAE of AISI grades C1040, C1046, and C1141.

Not only are these studs produced at less initial cost, but operating costs are reduced because Electreat studs require no additional heat treating. Elim-



• • •

Two studs in various stages of being machined from Electreat steel, are shown here in production on a Landis two-spindle threader, 1½" capacity. The operator is inserting stud stock. The stud, with one end threaded, is shown in the center.

• • •



Inspecting a stud made from Electreat steel. Machine is an Acme-Gridley six-spindle automatic screw machine, 2½" capacity.

ination of heat treating also means the studs are free from scale which inevitably forms during heat treating, and they are free from distortion caused by heat treating.

Uniformity in Electreat bars is carefully controlled in the Electreat induction process. Individual cold finished bars are fed continuously through an electric induction coil and heated to

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In 10 sizes, ranging from 4 x 3¼ x 5 and up.

**BOX PARALLELS**  
In 15 sizes, ranging from 3 x 4 x 12 and up.

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In 19 sizes, ranging from 4 x 9 x 5 and up.



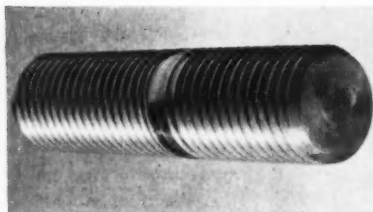

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A finished stud.

• • •

desired quenching temperature.

As the bars leave the coil they are immediately quenched by a cone of water sprays which strike the steel at high pressure. The rapid cooling is followed by appropriate tempering to obtain required physical properties.

Flexibility of the process enabled J & L to develop a cold finished steel with core properties and surface hardness not obtainable in conventional

treatments. The bar stock can be Electretreated and ground or Electretreated and turned and ground.

It is now available in round  $\frac{1}{2}$ " to 2", hexagons  $\frac{1}{2}$ " to  $1\frac{1}{4}$ ", and squares  $\frac{1}{2}$ " to  $1\frac{1}{4}$ " in length from 10 feet to 24 feet. Other sizes will be considered in special cases.

The following grades are available: Plain Carbon — SAE or AISI C1025 to C1050 inclusive; Free Cutting — SAE or AISI C1137 to C1144 inclusive; Alloy Grades No. 1 and No. 3; Alloy grades up to .50 carbon will be considered.

**Buyer's Comparison Chart** for multiple spindle automatic bar machines enables the prospective purchaser of equipment to chart the advantages and features of the various available machines on a ready-made master chart. In interesting chart produced by the **Cone Automatic Machine Co., Dept. BB., Windsor, Vt.**



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Chamfered corners for locating the base.

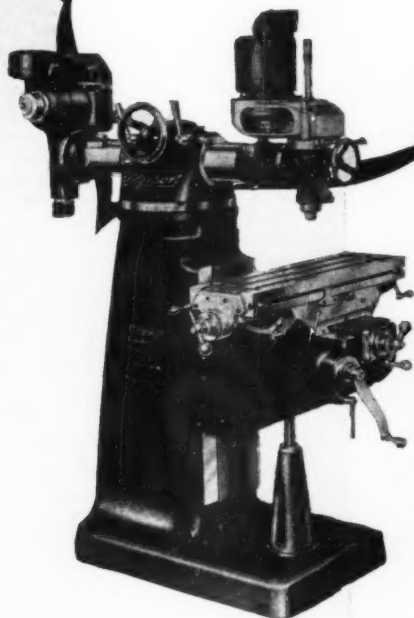


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Features include: 15" diameter turret with 5" overarm, rugged construction, table, knee and saddle in convenient front-of-machine position, anti-friction bearings throughout, keyed overarm with worm wheel control for angular settings, large diameter graduated dials.

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# *Bridgeport*

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**BRIDGEPORT, CONN.**

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# Shop Hints

## A QUICK-ACTING MILLING FIXTURE

by Robert Mawson

Many of the parts used in Textile Machines do not require the precision machining which is necessary when building other machines, such as production tools or machines which operate at a comparatively high rate of speed. In fact, some of these details do not use special machining tools of any kind, the parts being provided with fitting strips which are filed or chipped to obtain suitable connecting surfaces.

However, while recently in a plant which manufactures a line of small Textile machines I was interested to observe the large number of machining tools, jigs and fixtures which were being used to produce the details for these machines. As these machines are used in various countries it is necessary that the parts be interchangeable as regards the holes or contact surfaces. This procedure is very important when machine parts are sent out for repairs.

In general, the jigs and fixtures used at this plant are not as elaborate as those employed in many other industries. They are simple in design, easy to load and to unload and in their building the important feature is that of employing some type of quick-acting holding device.

In the illustration Fig. 1 is shown a Former Holder made of cast iron which is one of the parts used on the machines. The first operation when producing this detail is drilling and then reaming the 7/16 inch hole. The cast-

ing is then machined on the two outer opposing surfaces. It is important that these faces are equal distances from the reamed hole and also the cored recess.

The machining of these two surfaces was first performed by locating the workpiece on a pin to fit the 7/16 inch reamed hole and holding down the casting with a clamp. Two milling cutters separated with a collar of the correct width were then used to straddle mill these surfaces. However, this machining method did not prove satisfactory. The machined surfaces were not always equal in distance from the hole and cored hole. Again the pro-

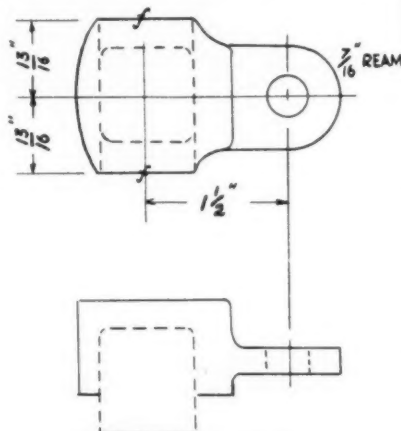
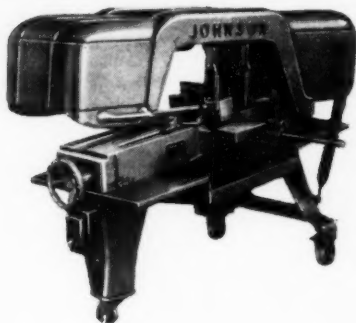


FIG. 1 FORMER HOLDER - CAST IRON



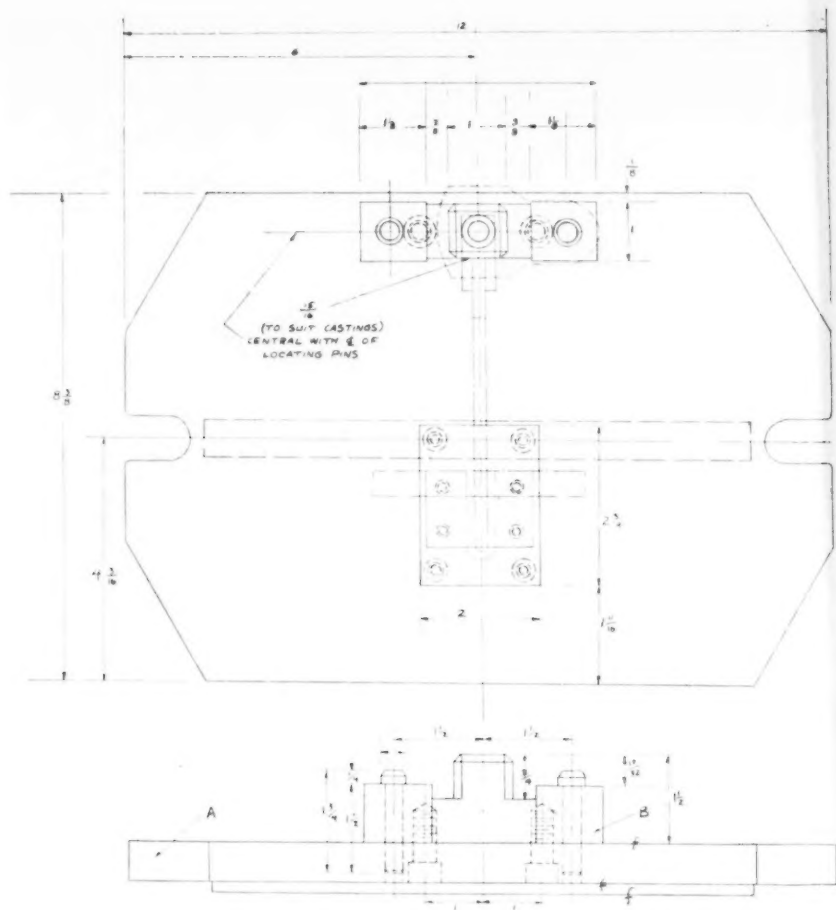
## **More Plants Want JOHNSON BAND SAWS**



**THE FISHER TOOL COMPANY**, Metropolitan New York Distributor, is shipping these fast cutting Johnson Model "J" and Model "B" Band Saws. The demand is up because more and more shops are finding out the economy and production advantages of Johnson band saw cutting — fast, even cutting, ease of changing blades, and, in the case of the smaller Model "B" saw, the handiness of having a portable metal cutting saw around the shop.

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616 CHRYSLER BLDG.,  
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duction cost was high owing to the time required for placing the piece in the fixture and the time consumed for removing the machined workpiece.

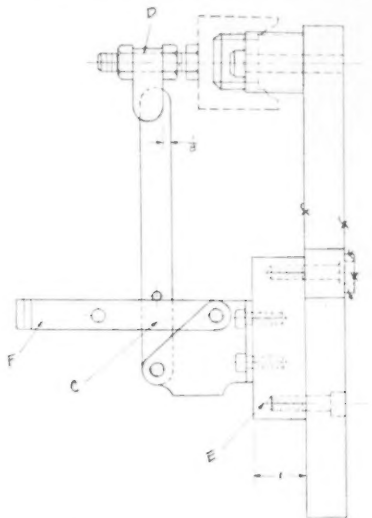
To improve on this method the milling fixture shown in Fig. 2 was designed and built. This fixture is made with a cast iron base "A" finished on the surfaces "F". The bottom surface of the base is machined with a tongue of the correct width to fit the slot in the milling machine table. The fixture base is provided with a slot at each

end of the proper size for bolts to fasten the fixture on the table.

On the fixture base, and fastened with two socket head screws, is a machine steel locating block "B". This detail is carbonized and hardened to resist wear. In the center of the block is machined a contour with the correct outline to fit the cored hole in the workpiece. Two tool steel locating pins are also placed in the block in the correct positions to agree with the dimension shown on the detail

Fig. 1.

The quick-acting holding device consists of a standard DE-STA Co Toggle Clamp No. 207 TL and shown at "C". At the upper end of the clamp arm is acetylene welded a small machine steel bracket "D". In this detail is placed a hexagon head bolt and two hexagon



nuts. The Toggle Clamp is attached to a machine steel block "E" with four socket head screws. The block "E" is fastened to the fixture base with four socket head screws.

To obtain the proper holding action of the Toggle Clamp the hexagon screw in the bracket "D" must be adjusted so that when the workpiece is held in position the handle "F" will be past its vertical center line in other words it must lean toward the bracket "D". If the lever does not comply with this requirement the pressure exerted by the milling cutter will tend to throw back the Toggle Clamp, therefore the hexagon screw and the workpiece will not be held securely in the fixture.

To use the milling fixture:—The fixture is first placed on the machine table being located by the tongue fitting in one of the table slots. It is held in this position with two tee

headed bolts placed in the machine table slot and through the cast slots in the fixture base. A milling cutter is placed on the machine arbor and adjusted until its cutting surface is the correct distance, 13/16 inch from the center line of the block "B".

One of the workpieces is then placed in the fixture being located by one of the pins, say the right hand pin, and fitting over the contour portion of the block "B". The Toggle Clamp is now pushed back with the lever "F" until the hexagon head screw comes in contact with the workpiece and hold it securely in position in the fixture.

The milling machine table, holding the fixture, is then fed across the revolving cutter and the desired surface is machined. This face is shown in the illustration by the dotted lines at the rear of the fixture. The machine table is now fed back out of contact with the milling cutter. The Toggle Clamp can then be pulled back or toward the operator. This releases the contact between the hexagon head screw and the workpiece which can then be removed from the fixture.

The workpiece is now turned end for end and located in the fixture by the left hand pin and the contour portion on the block "B". The Toggle Clamp is again brought into action as described and the workpiece is held ready for the second milling operation which is performed as noted. The Toggle Clamp is now drawn back and the finish machined workpiece can be removed from the milling fixture.

This tool is simple in design and can be used easily and quickly and produces the details accurately at a low manufacturing cost and solved the problem in question in a practical manner.

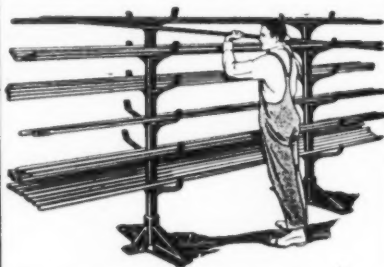
#### CUTTING SHORT PIPE ON A MILLING MACHINE

A milling machine may not be the best machine for cutting short pipe or round bars to accurate lengths, but it can be done creditably if no better way is at hand.

First, saw the pieces to approximate



Each BROWN SECTIONAL RACK combines five major and several minor features of design, all of which save money for its owner. The time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack is saved by the Brown Rack which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTIONAL RACK is a simple, durable article built in five styles from standard interlocking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or farther apart, while increases of stock can be met by simply adding more standard units. Built from metal throughout, depreciation is practically nil. SEND FOR BULLETIN NO. 26-B.

## BROWN SECTIONAL RACK

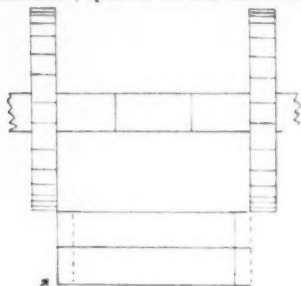
**BROWN ENGINEERING CO.**

126 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

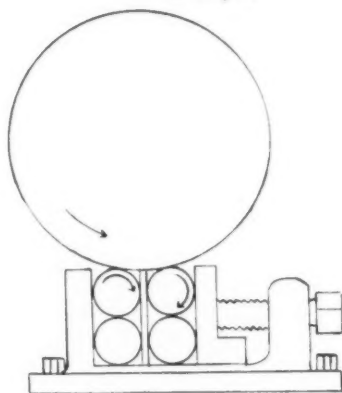
lengths, leaving plenty of stock to face both ends.

Second, set up the mill with two cutters of equal and relatively large diameter, spaced on the mandrel, slight-



Face

Move to position shown in dotted lines and face other ends to length.



Feed work  
Vertically to  
neutralize turning  
effect on roundwork

ly farther apart than the length of the finished pieces.

Third, clamp a number of the pieces in the vise, parallel to the spindle or

mandrel, with vertical spacers between the vertical rows, and one end of the pieces as even as practical.

Fourth, face off the even ends, with the corresponding cutter until all are cleaned up.

Fifth, adjust table cross-wise and machine off the opposite ends, with the corresponding cutter, until all are faced evenly.

Measure with Vernier Caliper, deduct the desired length from the caliper reading, and move the table over, the difference between the two dimensions, in thousandths of an inch, as guided by the cross feed graduated indicator.

This should bring these pieces to exact and uniform lengths, however, if there is any lost motion in the cross feed, it must be considered in setting the table over for this finishing cut.

Further warning, do not feed the work horizontally across the cutters, but line the work horizontally so that the vertical center line of the cutter lines exactly between the vertical rows of pipes and feed the work vertically.

In this way the cutter is inclined to turn the two pipes or rounds being cut at the same time, in opposite directions, which fact in a manner neutralizes the turning action as indicated in sketch.

If there are a great number of these pipes or rounds, it will pay to shim the cutters to exact distance as to face both ends at one operation.

**Air and Hydraulic Flow Charts** provide useful data. One table gives push and pull stroke pressures in lbs. for various cylinder sizes with various piston rod diameters. Other tables round out the charts. **Miller Motor Co., 4027 N. Kedzie, Dept. BB., Chicago 18, Ill.**

**Superfinishing** is a metal removing process and results in improvement of geometrical shape as well as surface smoothness. It removes surface down to metal of the desired structure and hardness. 30-page booklet gives technical information on superfinishing, correction of surface defects, measurement of surface smoothness, various machines and construction details. **The Gisholt Machine Co., Dept. BB., Madison, Wis.**

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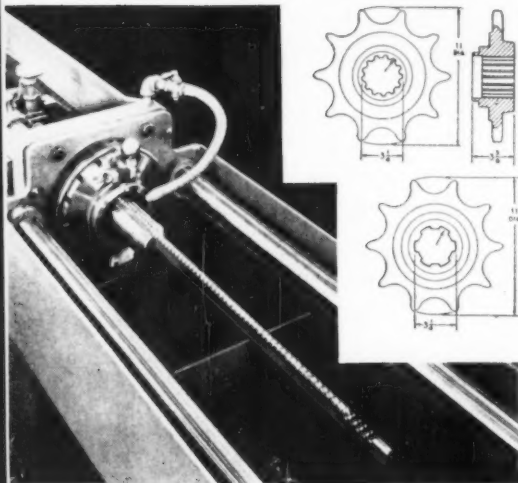
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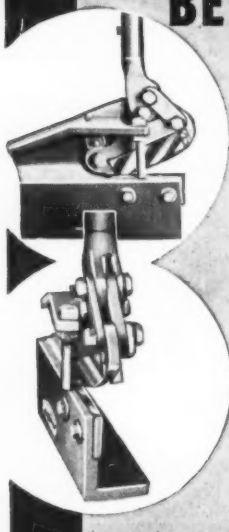


## SPLINING LARGE CUTTER CHAIN SPROCKETS



Involute and straight splines are broached with simple keyway type tools in large steel cutter chain sprockets on this machine. Up to 16 tooth involute splines and broached in sprockets with the tool and fixture shown. Sprocket is securely clamped to split ring in indexing plate having 16 indexing notches. Position of clamping ring is adjustable. After each draw, indexing plate and part are indexed in unison and locked in place with lever. Close spacing accuracy of splines is possible because indexing error does not accumulate. On pass each of two form tools is required to finish each spline. Sprockets with involute and straight splines are shown in the sketches. Machine is a Type XL-20 Single Ram Horizontal Broaching Machine made by The Oilgear Co.

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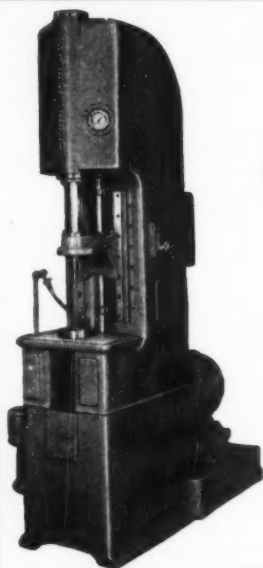
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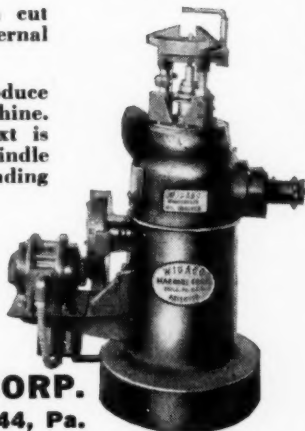
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Wayne Junction, Philadelphia 44, Pa.

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One of the most unusual of recent automatic brushing machines designed to speed up production and reduce costs is one built into a continuous strip process for the production of engine bearings.

This new operation, designed by the Federal Mogul Corporation, of Detroit, is being utilized in the production of both plain and flanged thin wall engine bearings.

According to The Osborn Mfg. Co., of Cleveland, the new Federal Mogul automatic brushing machine is unique in several respects. Its three brushing stages automatically clean the steel-backed surface of the strip of all dirt, rust and scale and then cleans all dirt from the babbitt lined side of the strip in a continuous operation.

Each of the three brushing units, see illustration, are operated by a 7½ horsepower electric motor. The first two units (shown at right and center) utilize

Osborn Master Wheels of 6-inch diameter and containing .0118 wire. The brush face width is approximately 10 inches and a special feature is an air pressure arrangement that maintains constant pressure on the metal back-up plate. This maintains even brushing pressure throughout the life of a brush, providing longer brush life and uniform wear over the entire brush face.

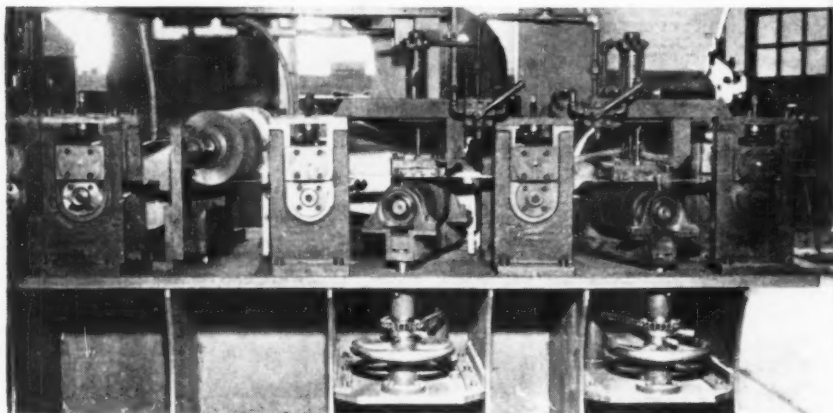
The brushes are turned slightly so that the brushing action is to some degree across the strip, another feature designed to give greater uniformity of brushing action and to prevent possible streaking.

The third brushing station (left), 8-inches in diameter, cleans and finishes the babbitt side.

Additional usage of the brushes is obtained by using the wire sections for deburring operations after their removal from the automatic machine.

• • •

This automatic brushing machine, designed as part of a new continuous strip process by Federal Mogul Corp., cleans both the steel-backed surface of the strip as well as the babbitt-lined side; the units at right and center cleaning the steel-backside and the unit on the left the babbitted side.



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**Thermocouple and Pyrometer Accessories.** 56 pages of detailed information on thermocouples, protection tubes, other accessories. A technical, or "Users' Manual," contains engineering hand-book data. Typical applications are illustrated. Tables of calibration data for the commonly-used base-metal and rare-metal thermocouples is included. **The Bristol Co., Dept. BB., Waterbury 91, Conn.**

**Phosphor Bronze.** Sections cover phosphor bronze strip and sheet wire, rod, castings, bushings and ingots. Tabular data on physical properties, chemical analyses, specifications and typical uses. **The Phosphor Bronze Corp. 2200 Washington Ave., Philadelphia 46, Pa.**

**Profile Projector.** Complete details of projectors which embodies entirely new features. Specifications, illustrations, drawings. **Hauser Machine Tool Corp., Manhasset, N. Y.**

**Steel Power Bending Brakes.** Used for bending material from 16 gauge up to  $\frac{3}{4}$ " thickness. Conical shapes and many other sections are formed with ease. Details of construction, drawings, attachments. 8 pages. **Dreis & Krump Mfg. Co. 7440 S. Loomis Blvd. Chicago, Ill.**

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**Oil Seals.** Gits High Speed Oilseals consist of three main parts: a high-quality bronze seal ring, a steel housing, and a diaphragm. 16-page booklet describes various types, sizes, gives applications, specifications, drawings. **Gits Bros. Mfg. Co., Dept. BB., 1846 S. Kilbourne Ave., Chicago, Ill.**

**Stock Gear and Reducer Catalog.** Divided into sections on reducers, gears, chains, and sprockets. More than 120 pages of engineering data, tests, ratings, ratios, formulae, tables and costs. Specs., drawings, sizes. **The Ohio Gear Co., 1335 E. 179th St., Cleveland 10, Ohio.**

**Dynamic Precipitator** functions as exhauster and dust separator. 20 pages discuss Roto-Clone precipitator type D. Constructional details, specifications, installation instructions, photos. **American Air Filter Co., Dept. BB., Louisville, Ky.**

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**Vertical Surface Grinder** has hydraulic table drive ranging of from 25 to 125 feet per minute. Constructional details of grinder. Specifications, drawings, photos. Interesting applications. 8 pages. **Pratt & Whitney, Div. Niles-Bement-Pond Co., Dept. BB., West Hartford 1, Conn.**

**Gear Motor.** Type UW gear motor is described, as well as foot and flange mounting of this unit. Dimensions, assembly positions, tabulation listing of torques, speeds, gear ratios and overhung load capacity. **Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill.**

**Milling Machines.** Types 2ML and 2MI are described in new 36-page catalog. Outstanding features of the machines are described in photos. Construction details, features, specifications, accessory equipment. **Cincinnati Milling Machine Co., Dept. BB., Cincinnati 9, O.**

**Ejector Type Tools** and the sizes in which they are available, as well as prices, are listed in 20 page catalog. Horizontal and vertical types, the variety of cuts possible with standard and special design, and grinding instructions are included. **Super Tool Co., Dept. BB., 21650 Hoover Rd., Detroit 13, Mich.**



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**Screw Thread Inserts.** Aeronautical materials specifications, AMS 7245 and AMS 7247 now available. Listed are chemical and physical specifications for inserts in corrosion-resistant steel and in bronze. **Heli-Coil Corp., 47—35th St., Long Island City 1, N. Y.**

**Sprocket Catalog** contains instructive technical data on roller block and silent chain and also chains on sprockets, reducers, and punch press drives. Photos, drawings, specifications. **Cullman Wheel Co., 1350 Altgelt St., Chicago, Ill.**

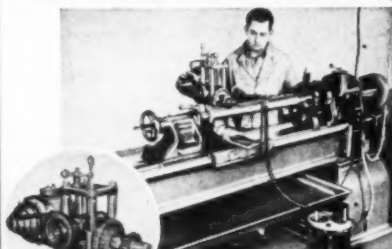
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**Milling Machine.** Index milling machine model 50 has a capacity of ¾" to 1" end mills in tool steel; a longitudinal feed of 20", cross feed of 9"; vertical knee travel 16". Booklet describes machine, photos, specifications, attachments. **Index Machine Co., 543 Mechanic St., Jackson, Mich.**

**Permanent Magnet.** Photos and pull curves illustrate many stock magnets, includes drawings of all stocked patterns. Property tables are included for reference. 29 pages. **The General Electric Co., Pittsfield, Mass.**

**Madison-Kipp Lubricators.** A series of 4 page bulletins describes various models of lubricators. All bulletins illustrated; constructional details; specifications; applications. **Madison-Kipp Corp., Dept. BB., Madison, Wis.**

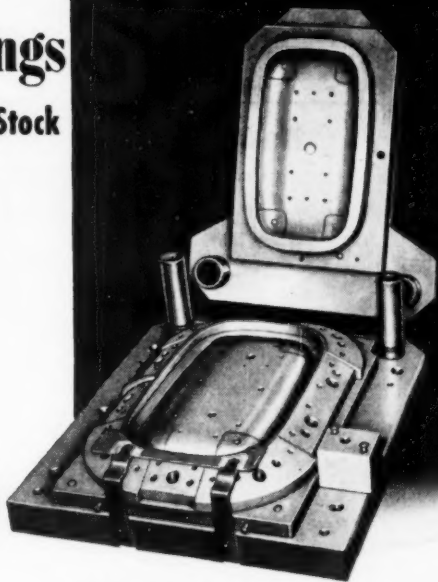
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Precision Die Set



Danly Precision Steel Die Set with dies used to blank and draw 14 3/4" x 8" pan from 24-gage pre-coated lithographed cold rolled steel. Forming and curling are handled as secondary operations.

## Drawing, blanking, forming and curling operations performed without marring satin-like finish

Here's an example of fine craftsmanship which is typical of the manufacturing methods employed by J. L. Clark Mfg. Co., Rockford, Ill. . . producers of high quality lithographed steel ware.

Without marring or scratching the satin-like finish of pre-coated lithographed stock, the die illustrated blanks the center and produces an unusually smooth draw on this 24-gage steel pan. In a similar manner the edges are formed and curled in secondary operations.

## Accurate punch and die relationship required

To assure accurate set-ups and precision results throughout, Danly 2-Post Precision Steel Die Sets are used, which are accurately machined top and bottom and equipped with leader pins and bushings lapped and honed to Danly precision standards. Because accurate punch and die relationship is maintained, full advantage is taken of the die makers' precision. The results are more stampings per grind, better product quality, and lower production costs.

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Illustrates how you can use Danly's unusual machining service for special die sets to effect substantial savings in time and money.



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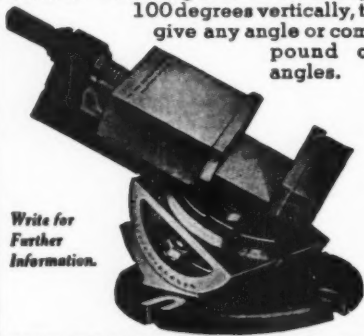
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Swivels 360 degrees horizontally,  
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give any angle or com-  
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be arranged through General Electric  
Arc Welding Distributors or through  
local electric utility power sales de-  
partments, or by writing General  
Electric Co., Apparatus Department,  
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This film is virtually a "must" for  
welders and foremen, as well as for  
classes in the various technical phases  
of arc welding. The picture brings  
out in interesting detail, the many ap-  
plications to which arc welding lends  
itself. It shows how the beams for sup-  
porting a bridge roadway are welded  
together; also how the open-flooring  
grid-type of bridge "pavement", built  
in sections, is welded, after being fitted  
to the bridge floor.

The different uses of arc welding in  
metal arc fabrication are brought out  
in a series of pictures which show how  
the welding adds tremendous strength  
to various metal pieces, even under  
high pressure, with the further ad-  
vantage of reduced weight.

The submerged-arc process is illus-  
trated by showing how locomotive  
boilers are fabricated by rolling plates  
into a cylindrical shape which is then  
seam-welded by machine. The cylin-  
drical sections are subsequently joined  
together by circumferential seam welds.

The many aspects of metal-arc fab-  
rication, such as in welded, tubular  
construction are clearly shown by in-  
teresting individual shots. The use of  
atomic-hydrogen fabrication, as in air-  
craft work is shown, for example, in  
the construction of a turbosupercharger

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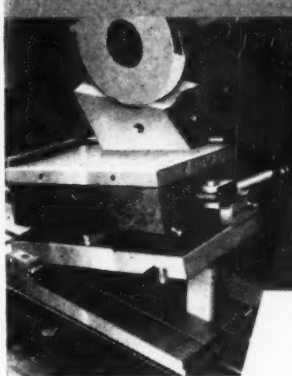
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Bore hole square with face

Grind faces

Inspect and check all dimensions and angles



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The work is held in a permanent magnetic chuck. It's simple.

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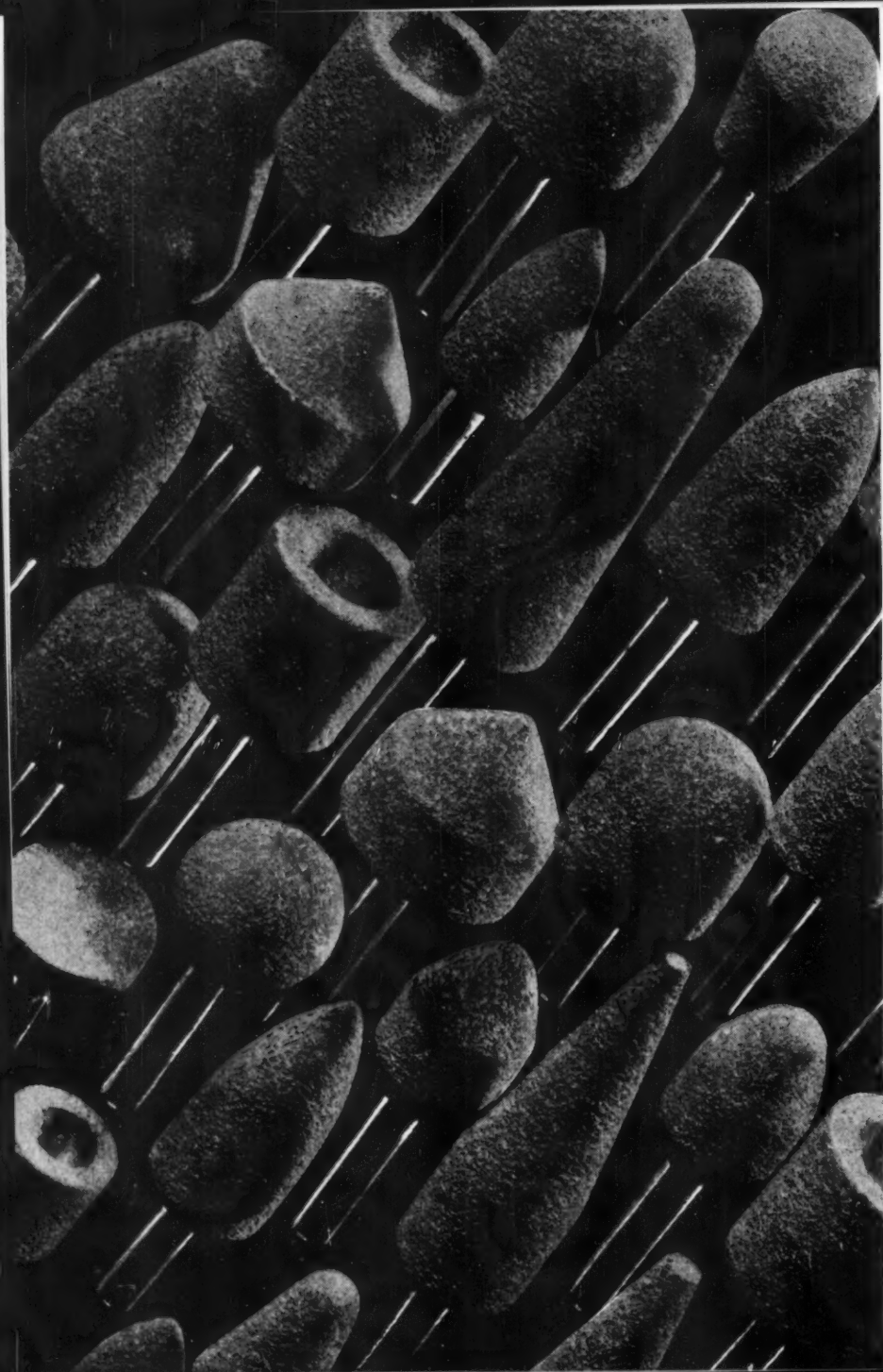
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nozzle box, in which a flanged butt joint is being made, manually, in .062" stainless steel. With atomic-hydrogen welding, metal with the same analysis as the base metal can be deposited. This efficient welding process permits engineering changes, as well as repairs, to be made economically. A \$2000 die is shown as one example of the salvage made possible by atomic-hydrogen welding.

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35 mm. sound slide films, 33 1/3 r.p.m.  
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This series of six films comprises a visual training course for foremen that deals with production and job attitudes, as well as safety. The cartoon technique is used in two of the films, and action shots of workers on the job add realism to the plant scenes. The narration is by professional radio announcers. Dr. J. L. Rosenstein, psychologist and associate professor at Chicago's Loyola University, served as an advisor during the production of the series.

Each film deals with one aspect of the complex art of handling people. The series shows supervisors how to train new workers, how to keep experienced workers alert, and how to win the respect, cooperation and loyal support of their men.

The six films are entitled, "The Secret of Supervision," "Teaching Safety on the Job," "People Are All Alike," "Everybody's Different," "Teamwork for Safety" and "Safety Case Histories." The last film, presenting instances of actual accidents, can be stopped after each case to enable audience discussion of what caused the accident and how it could have been prevented by proper supervision.



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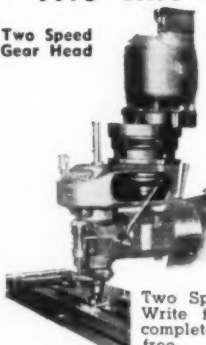
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# New Books

## MACHINE DESIGN

By Louis J. Bradford, B.S., M.E., Professor of Machine Design, The Pennsylvania State College, and Paul B. Eaton, M.E., Professor of Mechanical Engineering, Lafayette College. John Wiley & Sons, New York. Fifth Edition. \$3.25.

While the book was written primarily as a textbook, it will prove helpful to the practicing engineer. It may serve as a brush-up or a source of practical knowledge which engineers, though removed from machine designing, may find applicable in their work.

In the selection and treatment of the material included in this volume, the following objectives have been sought: 1. To present fundamental facts and processes of machine design; 2. To assist readers to analyze problems, to recognize the fundamental principles involved and apply sound methods of solution; 3. Present a reasonable background and general knowledge of good practice, both as regards selection of the material and the arrangement and proportioning of parts. Examples have been used freely throughout the work in order to clarify the general statements of methods employed in attacking various problems of machine design. Problems have also been provided in the interest of attaining facility in analysis.

In this, the fifth edition, the authors have held to their original objectives and have incorporated the significant changes made during the last six years. They have also pruned the edition of material which has become obsolete during the last years.

The additions relate principally to

the fatigue of metals, modern ideas concerning the nature of friction and lubrication, and special precautions necessary in designing parts made from aluminum.

Among chapter headings are: Fundamental Definitions and Considerations; Friction and Lubrication; Bearings and Sliding Surfaces; Friction Clutches and Brakes; Shafts; Force and Shrink Fit; Screw and Screw Fastenings; Toothed Gearing; Belts and Chains; Springs; Flywheels; Miscellaneous Machine Elements.

### MACHINE SHOP ESTIMATING

By W. A. Nordhoff, *Machine Shop Estimator, Douglas Aircraft Co., Inc.*  
Published by McGraw-Hill Book Co., New York, 1947. First Edition. 486 pages. \$6.00

A practical, down-to-earth book which provides a scientific basis for evaluating the performance of machine shop operators by showing them how to estimate the time required to perform a given job. It is interesting to note that this book is an outgrowth of Douglas' war-time problems. During the war the supervisory personnel of Douglas was asked to evaluate the work of the thousands of inexperienced workers which accelerated production schedules forced upon them. Mr. Nordhoff's book on machine shop estimating is one of the attempts to train workers in the art of evaluating machine shop jobs in terms of time and cost.

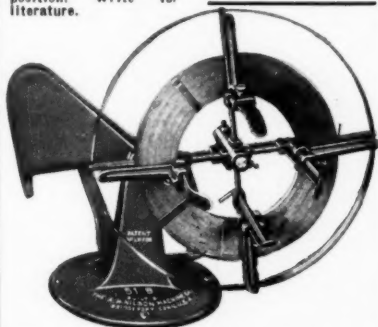
With the help of this book an untrained person can, in a relatively short time, do an efficient job of estimating with very little supervision; also, the purchasing agent can, with the material in this book, check on the fairness of the bids on work by outside machine shops.

The book lists all of the elements of operations performed in an average machine shop and establishes reasonable time values for their execution by the average operator. All machine operations are fully described and various methods of estimating the time required to fabricate machined parts are explained. Tables supply machinery

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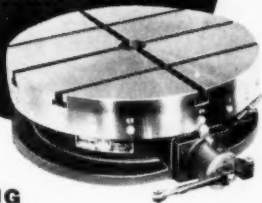
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No. 14

### BALL BEARING

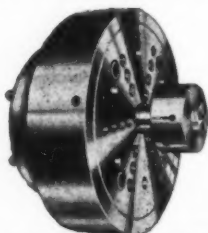
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elements which are generally variable. Sample estimates are shown for all machine operations to assist the reader in doing his own estimating.

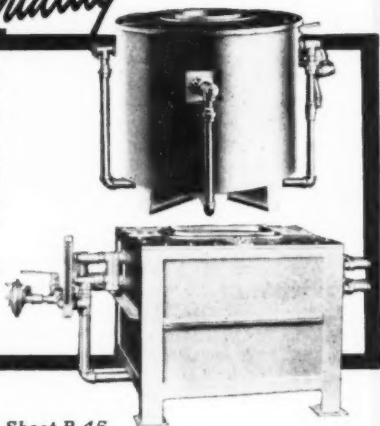
The various machine shop operations are grouped under the particular machine tools on which the operation takes place. Thus, the book contains chapters on Turning and Allied Operations, Boring and Allied Operations, the Turret Lathe Family, Grinders and Grinding Operations, and others. Not only the more common, or standard, machine tool operations are discussed, but also the more specialized, meaning those not found in every machine shop: Broaching Machines and Broaching, Hobbing Machines, etc. Typical parts which are produced on the various machines are analyzed and evaluated.

This is an excellent book for those shops which still use the rule of thumb method of estimating job and operator performance.

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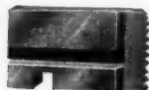
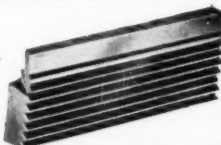
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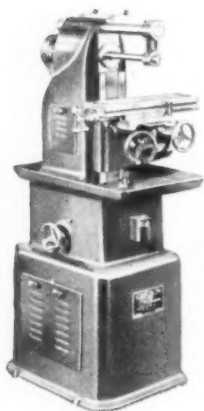
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These 3 precision machine tools are a necessary part of every completely tooled shop . . . a modern precision lathe with "Zero Precision" tapered roller bearings that will retain its extreme accuracy at new high operating speeds . . . a convenient back-geared shaper that embodies all major design improvements . . . a capable small milling machine that will do accurate work . . . all three are extremely moderate in price.

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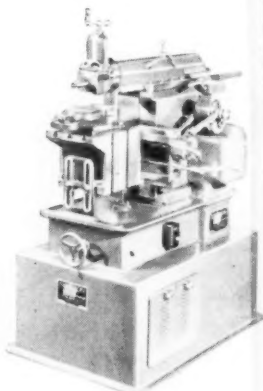
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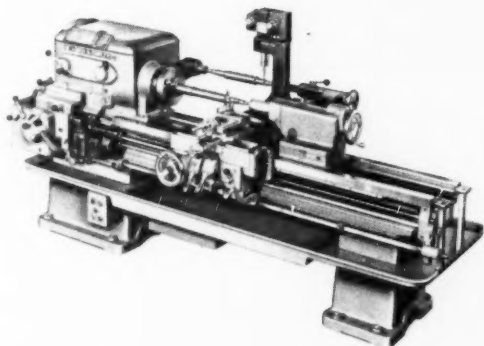
# What's New in METALWORKING

## THE "COPYMATIC" TRACER-CONTROLLED, DUAL-PURPOSE LATHE

Just announced by the Lodge & Shipley Company is a new tracer-controlled dual-purpose lathe. Known as the "Copymatic", the machine embodies an all-hydraulic tracer control in the company's standard Model "X" 16-inch, 20-inch medium and heavy duty, and 25-inch medium duty lathes.

The outstanding feature of the lathe, according to the manufacturer, is the ease with which the unit can be converted from standard lathe operation to automatic duplication, and vice versa. The change-over is instantaneous, accomplished by turning two valves and a switch.

On duplicating work, the tracer will operate from round or flat templates, doing any type of turning or boring jobs within the range of the lathe equipped with tracer control. Reproduction of multiple diameter shafts with square shoulder faces, grinding necks, tapers in both directions, chamfers and curved contours, as well as similar boring operations are performed quickly and to a very high degree of accuracy, the manufacturers state.



In many cases, the need for a template is eliminated. The first piece of a lot can be machined by standard operation of the lathe; this piece is then used as a template for the production of the balance of the lot.

The swing capacity of the standard lathe is maintained because standard compound rest and cross feed screw assemblies are used and directly connected to the hydraulic piston operating within the cylinder mounted on the rear of the carriage. This feature and the fact that the machine may be used for either standard or duplicating work

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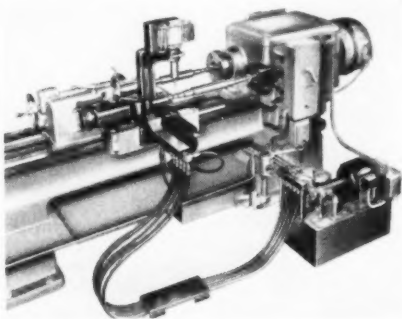
Simplify work for your die setters and press operators. Get easy-to-install Style "M" Roll Feeds. All the features of higher priced feeds. Positive, silent roller drive

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**F. J. LITTELL MACHINE CO.**  
4153 RAVENSWOOD AVE., CHICAGO 13, ILL.

without limiting the range of either, removes the unit from the "special purpose machine" classification, according to the maker.



The hydraulic tracer equipment furnished on the "Copymatic" includes a hydraulic pump and motor, purulator, air filter, tracer head and one stylus, valves and switches, hydraulically-operated clutch and brake for controlling longitudinal feed, hydraulic piston and cylinder for cross feed control and supports for the templates.

Further details, including description of operation, equipment and other information are given in Bulletin No. 675, available on letterhead request from:

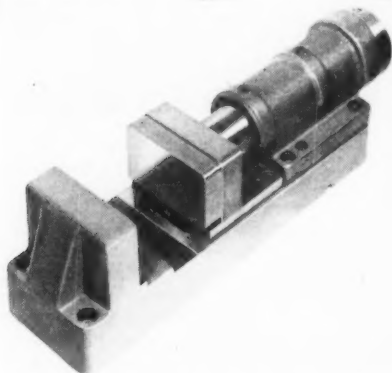
**The Lodge & Shipley Co., Dept. BB**  
Cincinnati 25, Ohio

#### PROGRESSIVE HYDRAULIC PUNCHING UNITS

A new line of standardized hydraulic punching units, with cylinders interchangeable on different bases, is announced by Progressive Welder Company. These compact, powerful units may be used for most production jobs which involve punching, shearing, notching, trimming or forming—eliminating the need for large presses and cam dies. They are available in eight different types of base mountings—closed end; open end; floating type; rocker type; front or rear end flange mount; open end two guide pin type; and open end three guide pin type—and are standard in 2, 3, 4, 5 and 6"

diameters and stroke lengths of 1, 2, 3, 4, 5 and 6".

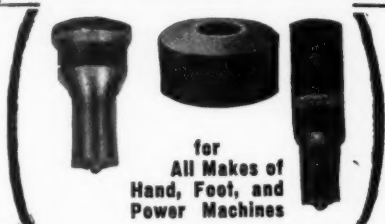
The cylinders of these units are interchangeable on the various types of bases, permitting almost complete equipment salvage when retooling a job. Cylinders may be removed from a base with only two Allen wrenches. Adapter plates are also removable, without disturbing either cylinder or base to adjust or service the punches.



Innovations in the hydraulic system include positive hydraulic return of the piston incorporated within the unit without increasing size or weight. Dash-pot cushioning at both ends of the stroke prevents the slap of the piston, thus reducing shock. Since the pistons are of sleeve construction, they provide full length guides during the stroke, which in addition to hardened and ground ways, maintains precision of punch alignment and permits accurate off-center punching. Other features include wear-resistant rubber-backed split-ring dual metallic piston seals; "O" ring static seals; ability to handle working pressures up to 2,500 pounds p.s.i. The illustration shows a typical Progressive punching unit. Several types of bases are interchangeable with the one shown using the same cylinder. For complete information, write:

**Progressive Welder Co., Dept. BB**  
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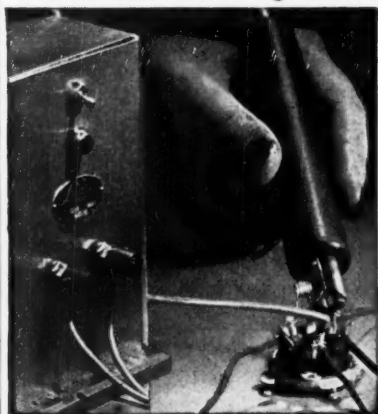
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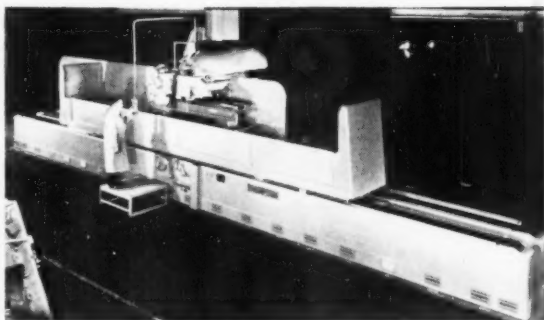
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## GIANT THOMPSON WAY-GRINDING MACHINE

A massive new way grinding machine has been added to the line of large heavy duty surface grinders manufactured by The Thompson Grinder Company. This new unit is known as the Thompson Heavy Duty Type CX 30" x 48" x 196" Hydraulic Way Grinder. The model illustrated has a giant 46-foot bed length, and was manufactured for a well known lathe manufacturer to grind the ways of larger machines more rapidly and with extra precision.



The machine is equipped with an auxiliary vertical spindle for grinding safety gib, clamp surfaces and rack seats on the machine bed. Lathe bed ways are ground with the horizontal spindle having a grinding wheel trued to the proper angle for Vees and Flats. The working capacity of the horizontal spindle is 240".

Requirements for Way Grinding Machines are governed greatly by the design of the machine parts to be ground. For this reason nearly every unit is custom designed to meet requirements of specific jobs.

Massiveness is the keynote of the construction details of this machine, exemplified by the heavy base and single column. The column alone weighs over ten tons. The heavy rib construction throughout the base pro-

vides a rigid foundation and assures permanent accuracy under continuous heavy duty grinding operations. The high powered precision wheel head and slide unit is mounted on a single column with large rectangular ways and with a very favorable ratio of length to width of bearing span to assure accuracy throughout the complete range of movement on the wheel head unit. Flame hardened wheel head slide ways are precision ground for permanent accuracy and protected by neoprene bellows way covers.

In spite of its size and weight, this machine features control simplicity. Just two levers control this entire hydraulic movement of the table and wheel head units. Anti-friction elevating nut permits accurate feeding of the wheel head of .0001". Controls are hydraulically balanced for finger tip



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DEPT. A-2 8700 GRINNELL  
DETROIT 13, MICHIGAN

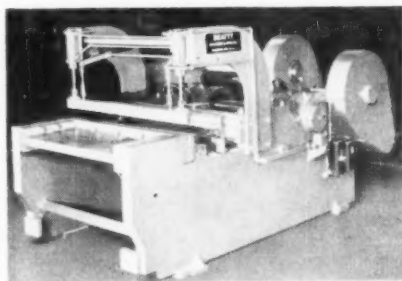
operation. Table and wheel head feeds are hydraulically operated. Table speeds are variable between 10 to 100 feet per minute with single lever control. Fast operation with heavy table loads is accomplished without shock or dwell by means of a patented valve having simple micrometer adjustments.

An automatic feed to the wheel head acting at each reversal of the table is easily adjustable. Hydraulic rapid traverse is 240" per minute and hydraulic wheel truing, 6" per minute. The wheel head unit is powered with a 30 h.p. motor mounted on the wheel head. This combines maximum delivery of power to the grinding wheel with permanent freedom from vibration. For complete specifications and operational data, write:

**The Thompson Grinder Co.,  
Dept. BB  
Springfield, Ohio**

#### BEATTY HORIZONTAL MULTIPLE PUNCH

A Horizontal Multiple Punch, believed to be one of the first of its type, is announced by the Beatty Machine and Manufacturing Co. The machine is designed for multiple punching the flanges of long, wide sheets, and allows for punch tools to be mounted on varying centers across the ram face.



The machine is fitted with an air clamp device which holds the material down during the punching operation for gauging purposes. Stripping is accomplished by air cylinders which travel with the ram. The frames are of welded steel plate. Clutches are of

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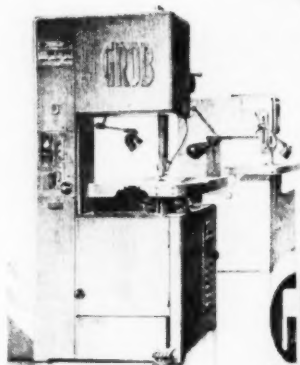


—head rivets from smallest to  $\frac{1}{2}$ " diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

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the jaw type, with motor drive, V-belt to flywheel.

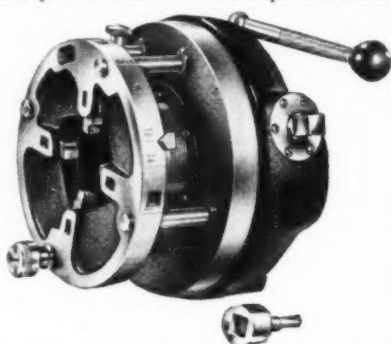
The new unit is available in capacities from 50 to 300 tons. The specifications on the 200-ton machine illustrated include a 6" stroke which actuates 28 times per minute. The distance between the housings is 63". The table length, from right to left is 72"; table width, vertically is 9". The ram is 7" long, from right to left, and has a vertical width of 10 $\frac{3}{4}$ ". The throat depth is 5". For complete information on these units, write:

**Beatty Machine & Mfg. Co., Dept. BB  
Hammond, Indiana**

#### PORTABLE POWER PIPE THREADER

A new development which should create widespread interest in manufacturing and assembly plants throughout the industrial field is the new No. 165 Portable Power Pipe Threader, just announced by the Armstrong Bros. Tool Co. The new unit can be operated by any  $\frac{1}{2}$ " standard electric drill. It will thread pipe of 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ ", or 2" dia-

meters with one set of high speed steel chasers. The device weighs only 26 pounds, and is thus easily portable from one job to another. The Pipe Threader



is furnished complete with one set of steel chasers and a drive adapter. For complete specifications on this useful new tool, write the manufacturers:

**Armstrong Bros. Tool Co., Dept. BB  
5200 W. Armstrong Ave.  
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### HYDRO-PRESS

**\$84.00**

FIVE TONS of smooth power is at your service with this compact and versatile tool.

The perfect press for garage, electric motor shop, refrigerator repair and machine shop.

Will operate lying horizontal.

Ram has removable anvil and retracts itself when released.  
Stroke  $\frac{5}{8}$ "  
Weight 100 lbs.



**ARTHUR J. HURT & CO.**

360 SOUTH NAVAJO STREET  
DENVER 9, COLORADO

### ARTUS ARBOR SPACERS

The **COLOR** tells the **THICKNESS**



ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.

#### CONVENIENT TRIAL OFFER

#### Handy Spacer Assortment

10 ea. .001 — .0125 thick  
5 ea. .015 — .030 thick

#### 100 SPACERS IN ALL

$\frac{7}{8}$ " — \$3.10 1 $\frac{1}{4}$ " — \$3.80  
1" — 3.35 1 $\frac{1}{2}$ " — 4.70

Other standard sizes also available.

**Illustrated Folder Free.  
Immediate Delivery on  
Spacers, Gaskets, Shims**

#### INDUSTRIAL PRODUCTS SUPPLIERS

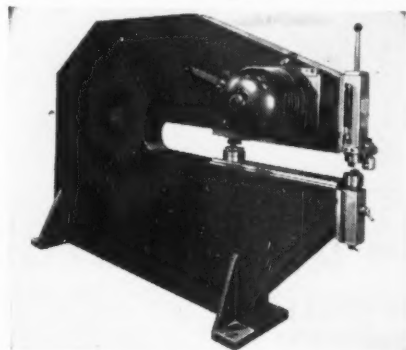
434 Broadway New York 13, N. Y.



### ELGE ALL-PURPOSE SHEAR

The new shear announced by Elge Associates utilizes the principle of successive, rapid shearing action which the manufacturer claims produces a continuous cut, with a finished, burr-free edge. The shear will cut any material within its capacity, such as fibre, brass, expanded metals, metal screen, stainless steel and paper products.

Material is not punched, but is sheared by a new principle which eliminates resistance to feeding and turning. The lower tool remains stationary, while the upper tool which is spring loaded reciprocates vertically. Cutting speeds of 10 to 40 feet per minute are claimed, depending upon the material.

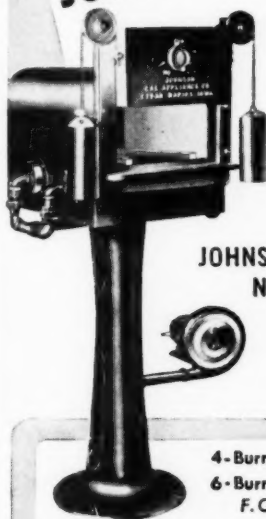


The shear, which will cut stainless steel up to 6-gauge and mild steel up to 5-gauge, is equipped with a  $\frac{3}{4}$  h.p. motor. The machine requires no extra equipment such as pilots, strippers or templates.

For cutting irregular shapes and circles, curved tools are used. Circles as small as 9" in diameter can be cut. For straight edges, large circles and curves, straight tools are used. Overall dimensions: 66" high, 24" wide, 86" long; from the cutting edge to the floor is 42"; throat depth is 5 $\frac{1}{2}$ ". Write:

Elge Associates, Dept. BB  
16 E. 71st St.  
New York 21, N. Y.

**TURN THE HEAT  
on HIGH SPEED STEELS  
Quick Acting  
JOHNSON FURNACES**



**JOHNSON Hi-Speed  
No. 130A**

**4-Burner \$295  
6-Burner \$325**  
F. O. B. Factory

### High Uniform Temperatures at LOW COST

Quick Acting JOHNSON No. 130A is available in two temperature ranges. 4-Burner unit is for steels requiring 1400—2350° F., and 6-Burner unit for 1800—2400° F. Powerful, efficient burners fire under hearth assuring fast, uniform heat. Save time and gas. Easily regulated. Firebox 7x13x16 $\frac{1}{2}$  lined with high temperature insulating refractory. Complete, ready for action with Carbofrax Hearth, G. E. Motor and Johnson Blower. Order Today!

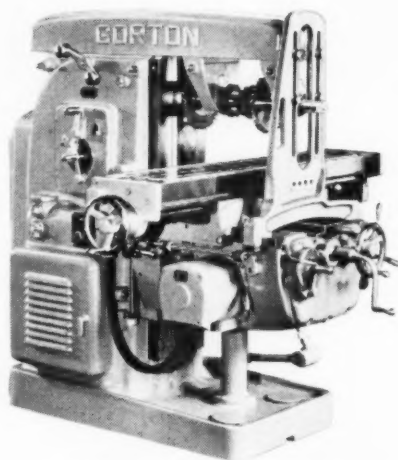
Write for Complete Catalog  
**Johnson Gas Appliance Co.**  
570 E Ave. N. W., Cedar Rapids, Ia.



## NEW GORTON 10 H. P. HORIZONTAL MILLING MACHINE

For the first time in their over fifty years of service to American industry, George Gorton Machine Co., manufacturers of precision machine tools, enters the production milling field with the introduction of their No. 2 size production mill. The new unit, designated as No. 2-28B, illustrated at the right, features a rigidity and stability approaching that of a bed-type machine.

A full 10 h.p. is delivered to the spindle through an efficient, simplified gear train, with only two gear shafts and two gears in driving contact at any speed. A separate motor is used for longitudinal, cross and vertical power feeds. The new machine features a full-width knee, mounted on the rugged one-piece column by means of a square lock bearing. The wide bearing assures maximum rigidity to the work piece, similar to a bed-type unit.



The saddle is equipped with a bearing spread on the knee almost equal



## You Need Only 1 DORMAN TAPPER

### AUTOMATIC REVERSE

... instead of 3 ordinary tappers to tap  
No. 2-56 to  $\frac{3}{8}$ " in steel!

### Plus Additional Advantages

1. No Collets to get lost or need replacement.
2. Floating Chuck Jaw and Adjustable Friction Drive to prevent tap breakage.
3. No Pressure required to operate, makes a perfect thread (class 4 fit) possible.
4. Compact, Light Weight Aluminum Housing, occupies absolute minimum for tap capacity.
5. Furnished with Quill Clamp for rigidity or M. Taper Shank for quick change.
6. Low Price—No. 1 Size M.T.S. \$44.00.

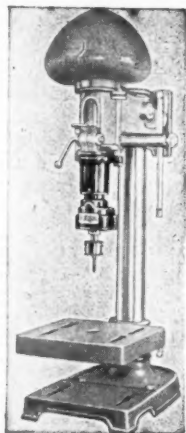
### 3 LARGER SIZES — POSITIVE DRIVE

2-A Cap.  $\frac{3}{8}$ " to  $\frac{7}{8}$ " in Steel. 3-A Cap.  $\frac{1}{2}$ " to  $1\frac{1}{4}$ " in Steel.

4-A Cap.  $\frac{3}{4}$ " to 2" in steel incl. pipe taps.

ALL UNITS EFFICIENT AS PRODUCTION THREADERS USING  
**ROUND SPLIT • BUTTON • ACORN DIES**

Write for Bulletin



**DORMAN MACHINE TOOL WORKS** 40 S. Mac Questen Parkway, Mount Vernon, N. Y.

to the table travel; this prevents the usual sag when the table is run out. The saddle is also strengthened by four ribs, none of which have been cut in two to provide room for mounting reverse gears of the table screw drive.

The balanced spindle is designed to provide mass and weight of metal close to the spindle nose by locating the largest gears at this point.

Eighteen reversible spindle speeds, in approximate geometric progression, ranging from 50 to 2000 r.p.m. are provided, at 40/1 ratio. Sixteen feeds from  $\frac{3}{4}$ " to 60" per minute for the longitudinal and cross feeds, and  $\frac{3}{8}$ " to 30" for the vertical feed, are provided.

The table measures 12" x 56" overall and actual working surface; it is equipped with three 11/16" T-slots. The vertical feed is 18 $\frac{3}{4}$ ", longitudinal feed, 28", and the cross feed, 12".

Automatic lubrication for spindle, gear train and speed box is provided by a pump and reservoir in the column. Lubrication for gearing in the knee, elevate, and column bearing surfaces is accomplished by a separate pump and reservoir in the knee. An additional pump and reservoir in the saddle provides lubrication for the table and saddle bearings and table screw drive elements.

The new No. 2-28B features full directional controls, closely grouped at the front of the knee for operator convenience, a simplified coolant system driven by a  $\frac{1}{4}$  h.p. motor in the right rear of the column base, and improved electrical controls.

For complete specifications, write for 4-page illustrated Bulletin, No. 2321, to: George Gorton Machine Co.

Dept. BB  
Racine, Wis.

#### ENPRO COMBINATION BLAST AND SPRAY GUN

The Enpro Combination Blast Gun, manufactured by Engineered Products Inc., is a versatile adaptation of sand blasting and solvent spraying. The gun is claimed to improve and simplify surfacing, production, cleaning and finishing in the automotive and industrial



#### DRILL BUSHINGS

Universal Drill Bushings with superhoned bores have been the first choice of industry since the founder of Universal Engineering Co. originated standard drill bushings nearly 30 years ago. Available in standard and special sizes to speed and simplify your jig drilling at greatly reduced tool breakage costs. Complete stock of standard bushings available for immediate shipment. Write today for complete information.

**UNIVERSAL ENGINEERING CO.**  
**FRANKENMUTH 10, MICHIGAN**

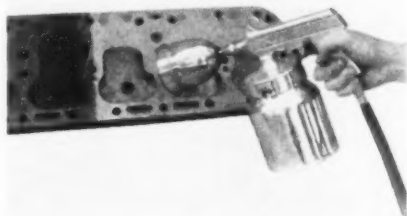
fields. Air operated and portable, the Enpro gun leaves no buffing marks, grooves nor ridges, no gouged nor uneven surfaces.

The gun is useful in reaching inaccessible places, corners, crevices, and close fittings. Users report increased production, lower labor costs, cleaner jobs, and better finishes.

The Enpro Gun is connected to any air line and is equipped for sand blast operations or spraying solvents and liquids. The nozzle is changed by loosening a retaining nut and slipping another nozzle in place. The gun balances well, is light to handle and easy to use. The operator simply points the gun at the surface to be prepared and pulls the trigger. Paint melts away; rust, scale and oxidation disintegrate. Solvents penetrate to flush out grease, gum and tar. Oils and liquids penetrate where needed.

Two attachments are supplied; an "Abrading" case-hardened nozzle for use in blast operations and a "Solvent" nozzle for use with oils or chemicals.

The device is equipped with a 3 pint container designed for positive locking with a quarter turn. The turbulence shield is designed to retain the bulk of spent abrasive that ricochets from surface being worked. Maximum air



consumption is  $9\frac{1}{2}$  cubic feet per minute at 100 to 150 pounds pressure. Descriptive folder is available upon request.

Engineered Products Inc., Dept. BB  
1224 Speer Blvd.,  
Denver, Colo.



**DYKEM STEEL BLUE  
STOPS LOSSES  
making dies & templates**

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

*Write for full information.*

**THE DYKEM COMPANY**

**2301G North 11th St., St. Louis, Mo.**  
In Canada: 2406 Dundas St. West, Toronto, Ont.

**USE ECONOMY**

Headless  
Set  
Screws







Socket  
Set Screws

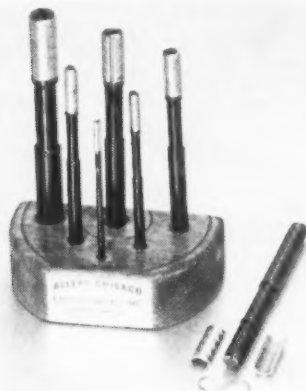
**Try Them On Your Next Job!**

**ECONOMY  
MACHINE PRODUCTS  
COMPANY**

5212 Lawrence Ave., Chicago 30, Ill.

### FAST-ACTING ALLERT-CHICAGO LAP

The self-expanding Allert-Chicago Lap has recently been developed by the Chicago Broach Co. Its performance is outstanding in speed and accuracy, according to its manufacturer, due to its unique design. The lapping sleeves, which align themselves when inserted in a hole for lapping, are the device's outstanding feature. The sleeves are free to move in any direction in case of a run-out in the drill spindle.

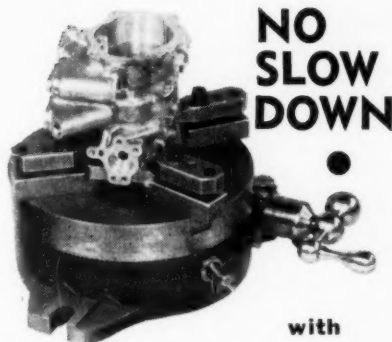


In other words, this lap performs as if equipped with a universal joint. The lap consists of a steel arbor, two copper sleeves, and an S-shaped spring. The lap is self-expanding because of constant pressure exerted by the spring on the two sleeves. The wearing surfaces of the lap are the full length of the sleeves, not merely one end or the middle portion; this results in much faster lapping and longer tool life.

The laps are sold in sets of six in the following sizes: 1/8", 3/16", 1/4", 5/16", 3/8", and 1/2", in lots of twelve.

The Allert-Chicago self-expanding lap can also be used in a multiple set-up for lapping holes in production, where several holes can be lapped at one time by means of holding the laps in a multiple drill head.

Chicago Broach Co., Inc., Dept. BB  
5514 W. Lake St.  
Chicago 44, Ill.



# NO SLOW DOWN

### with Kellner Precision Clamps

The only Perfected clamp for Jig Borers, Lathes, Milling Machines, etc. Kellner Precision Clamps eliminate the use of parallels and clamping blocks. They do the work better and in less time.

**TWO SIZES**

For Detailed Literature Write  
DEALERSHIPS AVAILABLE

**KELLNER MACHINE AND TOOL CO.**  
18490 MT. ELLIOTT      DETROIT 34, MICH.

## The New SAND BRUTE

**NEW MODEL "E"**  
**LIGHT WEIGHT**  
**ONLY 13 LBS.**

Save time on those sanding jobs. Use the new Model "E" SAND BRUTE. All magnesium housing . . . rugged . . . high speed . . . dependable. Send for circular on this, and our other models.

**Nedco COMPANY** Waltham 54, Mass.

## REED CYLINDRICAL DIE THREAD ROLLER

The Reed Rolled Thread Die Co., in introducing its new Model A32 Cylindrical Die Thread Roller, extends the application of thread rolling from  $\frac{5}{8}$ " to 4" diameter threads, inclusive. The addition of this machine enlarges the field of Reed thread rollers on heat treated steels and other types of materials, to thread sizes which heretofore could not be rolled, due to limitations of available equipment.

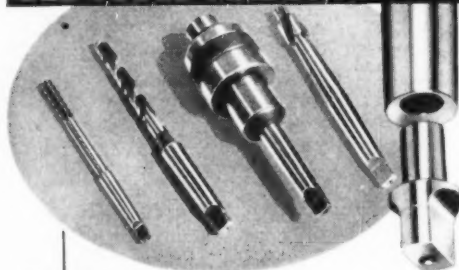
The new unit is of the horizontal type, and occupies only 60" x 66" floor space. The work blank is supported and positioned horizontally between three synchronously rotating cylindrical dies which act on the blank simultaneously, and hold it rigidly in proper rolling position.

The rolling pressure causes the material to follow the pattern of the dies, which remain in match during the rolling process. Thread form

and lead are, therefore, controlled to close limits by "matched" precision-



## OLD TOOLS MADE NEW with NU-TANGS



**NO WELDING! NO SLEEVES!**

**NO SHORTENING! NO DISTORTION!**

**GUARANTEED STRONG AS NEW!**

Send them to  
us like this



We return them  
like this



**at a FRACTION  
of NEW TOOL  
COST!**

Exclusive NU-TANG process † replaces twisted or broken tangs on any tool with a Morse taper (sizes 2 to 6). Any tool—drills, reamers, countersinks, cutters, drivers—repaired perfectly with brand new tangs. Amazingly low cost. Satisfaction guaranteed. NU-TANGS are used by leading industries. Send tools for prompt repairs—or write for prices and literature.

† Patent Pending

**NU-TANGS INC.**

4108 Spring Grove Avenue  
Cincinnati 23, Ohio

*write  
today*

ground cylindrical dies. Control of work dimensions is accomplished by positive adjustments for diameter, length and taper. Adjustable scroll rings in the head provide for approximate setting of the dies, while the final sizing of the work is obtained by a micrometer adjustment.

Stress rings provide support close to the work, assuring permanence of set-up and continuous production of parts to gage limits. Superior surface finish, regardless of material, is obtained by the rolling burnishing action of the cylindrical dies.

The penetration of the dies is controlled by a mechanical feed using a positive cam action that insures controlled rate of penetration; predetermined length of dwell, and positive duplication of size.

Five standard die speeds, ranging from 115 to 640 r.p.m., and seven standard work cycles ranging from 2 to 26 per minute, in conjunction with interchangeable cams offer any desired cycle of squeeze, dwell and release that may be required for different materials, work and thread or form specifications.

The drives that rotate the dies and control the feed are independently operated by individual motors—a 25-30 h.p. unit for the die drive, and a  $\frac{3}{4}$ -1 h.p. motor for the cam drive. A 55-gallon capacity built in tank is furnished for the coolant system, which has a separate motor driven pump and filtering system. For complete specifications and operational data, write:

**Reed Rolled Thread Die Co.,**  
237 Chandler St., Dept. BB  
Worcester 2, Mass.

#### KENT-OWENS MILLING MACHINE WITH AUTOMATIC INDEX FIXTURE

A Kent-Owens No. 2-20 Milling Machine, arranged with an automatic index fixture and all necessary tooling for milling irregularly spaced vent slots in piston rings, has been built for Segments Grenier, France, by the Kent-Owens Machine Co.

A group of rings are mounted on an adaptor which is placed in the fixture

## Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

*Buy Kipp air tools for best results, lower prices.*

MODEL JA  
\$0,000 R. P. M.  
**\$42<sup>00</sup>**  
IN U. S. A.



Weight 12 ounces;  
length 6 $\frac{3}{4}$  inches;  
chuck size  $\frac{1}{8}$  inch.  
Wheel guard removed for better illustration.

**MADISON-KIPP CORP.**  
207 Waubesa St., Madison, Wis., U. S. A.

• Skilled in DIE CASTING Mechanics  
• Experienced in LUBRICATION Engineering  
• Originators of Really High Speed AIR TOOLS



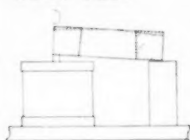
## UNBELIEVABLE THINGS that BODY FLO can do!

### BODY FLO

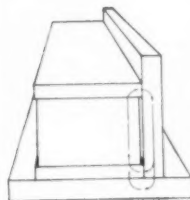
#### MAGNETIC CHUCKS



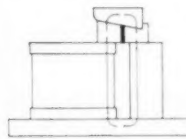
If you can visualize Magnetic Holding Power that exceeds the strength of a Samson, THAT is BODY FLO!



Exclusive feature with BODY FLO Chuck, grinding a die for shear by the simple method shown.



Instantaneous vertical set-ups possible, because sides of BODY FLO magnet are square with top and bottom.



All elements bonded together magnetically; shaped adapter out of l.c. steel, supports tapered cam for grinding.

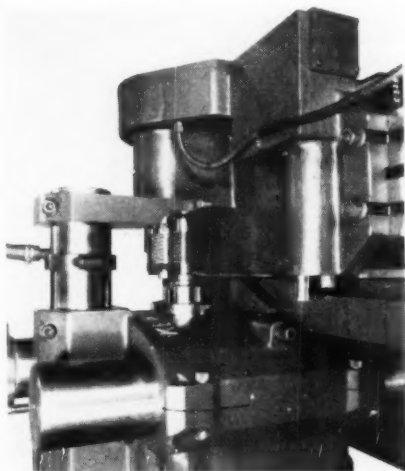
#### SEND FOR . . .

"Magnetic Chucking  
Revolutionized"

Consultants in Magnetic Tooling  
for Production

**Magnetic Holding Devices, Inc.**  
2034B EAST 22nd STREET  
CLEVELAND 15, OHIO

and the table feed is then engaged. The rest of the operation including milling, indexing, etc. is completely automatic. After the last slot is milled, the fixture or table of the machine will return to the loading position and stop. Additional work holding adaptors are supplied, so that the unloading and loading of the rings on the adaptor can be handled while the rings in the fixture are being milled.



The machine has a 42" x 12" table, with 20" table travel. Twelve spindle speeds ranging from 64 to 860 r.p.m. are available. The drive is direct, with only two gear contacts from motor to cutter. The drive is taken from a standard foot-mounted ball bearing motor at the rear of the machine and passes vertically through a splined drive shaft, worm and worm gear, then through pick-off gears, directly to the cutter. The head is mounted on two cylindrical ground steel posts which carry the spindle midway between them—a feature which provides rigidity without overhang and with no possibility of cocking action. For further details on this special automatic unit, write the manufacturer:

**Kent-Owens Machine Co., Dept. BB**  
Toledo, Ohio



## WHITALOY CHUCKS FEATURE STRENGTH, LIGHT WEIGHT, LONG WEAR

The Whiton Machine Company, realizing the demand for higher speed operation of machine tools, has developed the new rugged "Whitaloy" Chuck. The body is forged of a special analysis heat treated aluminum alloy. Thus the "Whitaloy" Chuck body eliminates much weight, which is the main factor to be considered, where high spindle speeds are required. Over the past 18 months this new chuck has proven itself to have the strength of steel plus the wearing qualities of cast iron, according to the manufacturers.

The "Whitaloy" Chuck contributes to present day high speed operation of machine tools, due to its lack of excessive weight, by facilitating quicker starts and stops and eliminating spindle drag. Due to the fact that the "Whitaloy" Chuck places less weight upon the spindle, there naturally is less strain and stress on the braking mechanism as well as all the other parts of the machine tool. Also the holding capacity of small precision lathes can be substantially increased due to lighter spindle loads. The lightness of this new chuck makes it easily handled and enables machine operators to change chucks rapidly.

The jaws, scroll and pinions are made of heat treated alloy steels. Scroll thread, jaw threads, gear and pinion teeth are machined to utmost precision and the bore of the scroll is machined

true with spiral threads. The scroll is chrome plated, assuring continued accuracy and longer wearing surface. The

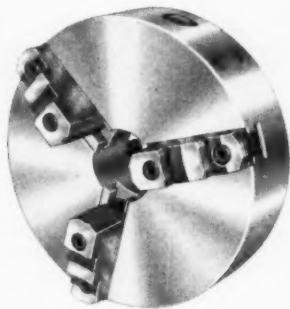


illustration shows the front view of a three-jaw gear scroll chuck.

The "Whitaloy" Chuck is adaptable to all spindle noses and is available in all types and sizes up to 15-inch. Suitable heat treated alloy steel wrench is supplied with each chuck. For complete details, write:

The Whiton Machine Co.  
Dept. BB  
New London, Conn.

## "STAR DUST"

LABORATORY GRADED  
PURE DIAMOND POWDERS

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN CARBIDE, CHROME.

- Absolute control of particle sizes
- Complete absence of out-size particles
- STAR DUST sizes as fine as .0001"
- Complete range of grit sizes

There is a STAR DUST Field Serviceman in your territory.

ACE ABRASIVE LABORATORIES

ONE SPRUCE STREET  
NEW YORK 7, N. Y.

STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

Precision LAPPING  
POWDERS for  
PRECISION work

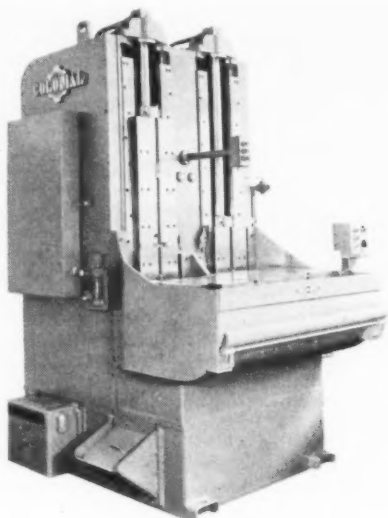


## COLONIAL DUAL RAM BROACHING MACHINES

A complete line of Dual-Ram broaching machines comprising nine basic sizes is announced by Colonial Broach Company. Designed specifically for surface broaching, the Dual-Rams feature completely new hydraulic and all electric control systems, a cycle control system which virtually eliminates machine idle time for re-loading, a forward-and-reverse jog cycle to simplify setting up, and numerous other features.

The complete line of nine machines includes the following sizes: 6-ton, 42- or 54-inch stroke; 10-ton, 42-, 54- or 66-inch stroke; 15-ton, 48- or 66-inch stroke and 25-ton, 48- or 66-inch stroke.

The major design objectives of these broaching machines, according to Colonial, have been to: 1) increase output efficiency by having the machine continue through its next cycle if the operator has finished loading before the first cycle is completed; 2) increase accuracy of output by a new table and column construction which gives more direct stress absorption; 3) provide increased hydraulic capacity for occasional overloads, by lowering the pressure at which rated tonnage is obtained; 4) provide improved cooling of interior of column (motor, pump, etc.) through a forced draft cooling system; 5) make servicing, when necessary, as simple as possible; 6) eliminate machine shut-downs



for routine maintenance (see below); 7) incorporate additional safety features from the standpoint of both the operator and machine or broach damage.

With the new all-electric cycling control, the machine can be set by means of the standard controls to operate on:

1. Automatic continuous cycle.
2. Single cycle or semi-automatic cycle with pre-set control (the machine continuing into the next cycle without stopping if a but-

OPEN

**Plain Type**

CLOSED TRADE MARK

CLOSED MARK

OPEN

**Offset Type**

# CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

**THREE-FOURTHS OFFSET.**

**AUTO Moulding & MFG. CO.**

**1110 E. 87TH ST.**

**CHICAGO 19, ILL.**

**SPECIFICATIONS:**

Open Width  $\frac{1}{8}$ " to 6"

Gage Material .040 to .125

Pin Diameter .101 to  $\frac{1}{16}$

Lengths to 120"

**SEMI-OFFSET**

ton is pushed before the first cycle has been completed).

3. Forward or reverse jog cycle, with ram and platen movements interlocked to prevent accidental damage to broach or part.

To reduce maintenance requirements and simplify servicing, all hydraulic and electrical control units are group mounted in two panels on the sides of the machines, and the complete systems have been designed to conform to the latest machine tool electrification and hydraulic standards. The van type hydraulic pumps are accessible in the column of the machine for ready inspection or service. Hydraulic system filters are readily removable so that they may be inspected and cleaned without stopping the machine or draining the oil. For complete specifications, on these new units, write:

**Colonial Broach Co., Dept. BB**  
**Box 37, Harper Station**  
**Detroit 13, Mich.**

#### NEW, COMPACT STANLEY STEEL RULES

Stanley Tools announce their new style "Pull Push" Rules, Nos. 346 (illustrated) and 348. They combine beauty, utility and new distinctive features including a die cast "D" shaped case; triple plated finish—chrome over nickel over copper; patented nickel plated or white baked enamel blades; vertical marking, which is easier to read; quick change blade feature with positive fastening. The new Stanley rules are



practical and compact enough to be carried in the pocket. Blades are rigid steel for measuring straight distances in any position, and flexible for circumferences and irregular shapes. They are available in 6 and 8 foot lengths.

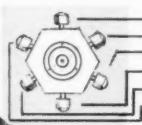
**Stanley Tools, Dept. BB**  
**New Britain, Conn.**

*the new*  
**Burgmaster**  
**6** **GIVES YOU**  
**MACHINES**  
**IN ONE**



A Universal turret type with pre-selective speeds and automatic indexing for six spindles.

Enables one operator to do the work of two or three and get the job done faster and better. A variety of jobs can be handled without moving the work piece from machine table. Simple to set up. Requires but 6 square feet of floor space. Powered by a single motor.



Drilling

Breaming

Tapping

Threading

Counter Boring

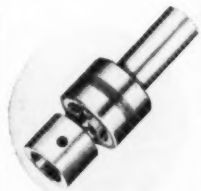
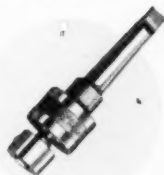
Spot Facing

Users will tell you that their Burgmaster is the most economical machine in their shop, and pays for itself in a short period.

#### *Tool-flex* NEOPRENE MOUNTED

##### RELEASING TAP HOLDERS

Simplifies tapping on turret lathes, drill presses, screw machines and engine lathes. All moving parts of holder are made of high grade tool steel, heat-treated and ground to close tolerances.



Tap breakage is held to minimum due to its Neoprene Mounting which absorbs shock, keeps taps centered and permits them to follow the original hole. The simple construction of Tool-flex assures long life under high speed operation.

Made with either taper as shown above or straight shank as shown at left. Made for right or left hand tapping.



WRITE TODAY FOR DETAILED INFORMATION

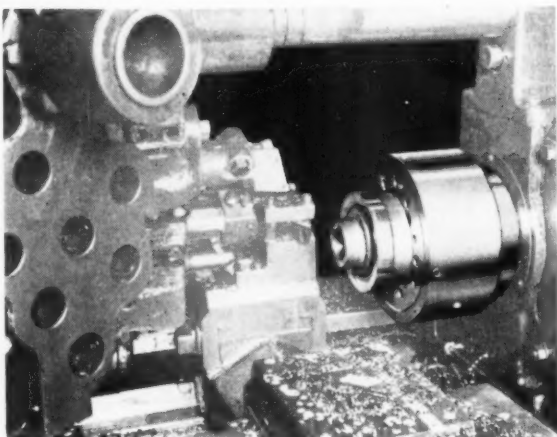
**BURG TOOL MANUFACTURING CO.**

5028 W. JEFFERSON BLVD., LOS ANGELES 16, CALIFORNIA

## THE SPEEDGRIP, FOR INTERNAL CHUCKING OPERATIONS

The Speedgrip Chuck was designed primarily for second operation chucking of parts where the bore and one face have previously been machined true with each other. These units are used extensively on turret lathes, automatic chucking machines, engine lathes, and multiple spindle boring machines; they may also be used to advantage on grinders, milling machines, gear shapers and hobbers, etc.

The chucks are made in six sizes, and will accommodate work parts with bores ranging from  $\frac{1}{2}$ " to 11" in diameter. The component parts consist of a semi-steel spindle adapter, a hardened and ground nose plate, expandable bushing and a hardened draw screw. The



chuck can be actuated by means of an air cylinder, drawback or pushout collet mechanism, or manually.

Speedgrip Chucks are precision built,

## Libert **Hi-Speed** SHEAR

CIRCLE CUTTING  
ATTACHMENT  
Included as  
STANDARD EQUIPMENT  
with this Machine



**MODEL  
1236**  
36-in. throat.  
12-gauge  
capacity.

**WRITE FOR  
BULLETIN**

**SIMPLIFIES Maintenance  
SPEEDS Production  
SAVES Manpower**

The *Libert* has amply proved its advantages by turning out top production—shearing flat or formed sheet metal, internal or external, plain or irregular shapes *rapidly, accurately, cleanly!*

Equally effective in maintenance work, *Libert* is cutting costs to rock bottom. Edges are smooth, need no finishing. Unskilled operators produce accurate work at once.

Sizes up to 60-in. throat, 10-gauge capacity.

**LIBERT MACHINE COMPANY**  
Green Bay, Wisconsin

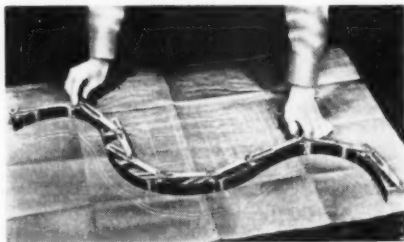
and will produce parts that are parallel and concentric within .0002". There are no parts that can become worn, to produce an eccentric or out-of-parallel. Changing from one job to another requires only the changing from one size expandable bushing to another, and in some instances from one parallel work spacing ring to another in a few minutes time. Four screws in the o.d. of the spindle adapter make it possible to adjust the nose plate with extreme accuracy, after which the chuck can be removed from the spindle and replaced many times without readjusting.

Parts may be chucked lightly, or with tremendous pressure, depending upon the nature of the work. Thin walled parts can be machined without distortion. As the expandable bushing is drawn back over the tapered nose, it not only expands to grip the bore of the work, but at the same time draws the work back to an accurate stop which insures the two faces being parallel. Sufficient pressure is exerted by the expandable bushing alone to direct most work, but in addition to this, a powerful drive is produced by the pressure of the work against the face of the nose plate, work spacing parallels or rings. Write for 4-page illustrated bulletin.

**Speedgrip Chuck, Inc., Dept. BB**  
1100 W. Beardsley Ave.  
Elkhart, Indiana

#### **FLEXIBLE TEMPLATE FACILITATES COMPLEX LAYOUTS**

An ingenious new invention which reduces layout work in drafting rooms



to a fraction of the usual time has recently been placed on the market. The

## *Rouse* **NEW HAND MILLER ATTACHMENTS MAKE MILLING SMALL PARTS Faster, Safer...**



The new Vise's specially slotted removable jaw enables it to hold odd shaped pieces, considerably increasing the Hand Miller's production. The new Safety Cutter Guard makes hand injuries virtually impossible.

The Rouse Hand Miller is an efficient, high speed, ball bearing, motor-driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials. It mills small parts fast—accurately—inexpensively, eliminating costly set up time and making it possible to use ordinary, inexperienced help.

**WRITE FOR ILLUSTRATED CIRCULAR**

**H. B. ROUSE & COMPANY**  
2214 N. WAYNE AVE., CHICAGO 14  
50 YEARS OF SERVICE TO INDUSTRY

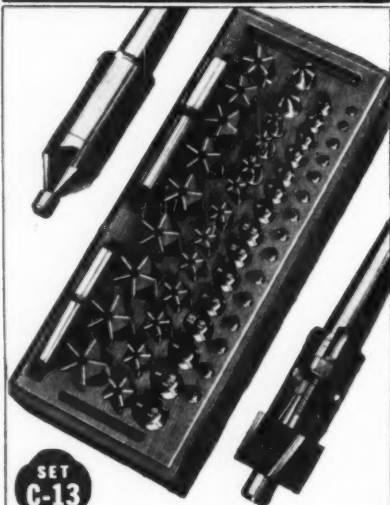
For heavy duty counterboring requiring rigidity, strength and perfect alignment, choose Gairing's type C. The handy kit shown below, gives you a wide range of cutter and pilot combinations.

## COUNTERBORE SETS

Write for Folder and Prices

**THE GAIRING TOOL CO.**

Roosevelt Park Box 478, Detroit 32, Mich.



Sturdy box with hinged cover contains: holders C-12 and C-13; 20 cutters from  $\frac{9}{16}$ " to  $1\frac{3}{4}$ "; 28 pilots from  $\frac{9}{32}$ " to  $1\frac{1}{8}$ " and two  $\frac{7}{8}$ " countersinks, one 70° and one 82°.



Flexible Template duplicates curves full size in a matter of seconds, often saving hours of curve plotting, tedious drawing and template making. The device can be set and locked to any desired shape, contour, curve or radius; it can be transferred to any location for construction or checking purposes. The template springs back to its original position when it is unlocked, ready for re-use.

The Flexible Template can be used to copy curves from blueprints, to take off construction lines, and in countless other operations. It eliminates trial-and-error fitting wherever curved materials must be fabricated or duplicated. The tool is becoming a "must" for construction and repair workers in wood, metal, glass, plastics, paperboard, wiring and piping. It is made of rugged spring steel and aluminum. It is available in lengths of 1-foot intervals; shortest length is two feet. For complete details on this useful new instrument, write the sales agents:

**C. H. Clark and W. E. Poggenburg**  
4900 Wynnfield Ave., Dept. BB  
Philadelphia 31, Pa.

### $\frac{1}{4}$ " DIAMETER ALUMINUM SHELLS

Podlin Tool Co., Chicago manufacturers of tools, dies and experimental work, have introduced another item to their list of products. The new development consists of small diameter aluminum shells, produced by the recently developed, economical impact extrusion process. These shells are available in



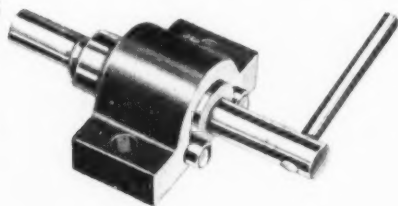
sizes of from  $\frac{1}{4}$ " to  $\frac{3}{4}$ ", in lengths up to six times the diameter. The manufacturer invites specifications or samples submitted for quotation. For complete details on these products write:

**Podlin Tool Co., Dept. BB**  
3922 Wesley Ave.  
Schiller Park, Ill.



### THE SPED-LOK, A USEFUL JIG LOCKING DEVICE

An ingenious Locking Device for jigs has recently been designed and put in production by Charles Green Co. The tool is patented under the name of Sped-Lok. The use of this small unit saves considerable production time by



cutting loading and unloading losses, according to its manufacturer. Use of the Sped-Lok also eliminates the necessity of hinge gates, screws or other means of holding work in its proper position.

The device operates with instantaneous, effortless locking. It compensates automatically for variations in diameter of work being held. The tool is made with hardened and ground cam sleeves and locking pins to insure long life. Cam sleeve adjustment screws permit precision settings after mounting.

The Sped-Lok is available in three models—Nos. A-210, A-211 and A-212, varying principally in the cam sleeve lengths, which are 1-11/16", 2", and 2-1/8", respectively, and in the diameter of the plunger rod—7/16", 1/2", and 5/8" of compact design, this useful device is handy in close quarters. It is made of high-carbon steel, adaptable for various end mountings. The device can be placed any distance from the work by using longer plunger bolt. Write for bulletin to:

Charles Green Co., Dept. BB  
1324 W. Roscoe St.  
Chicago 13, Ill.

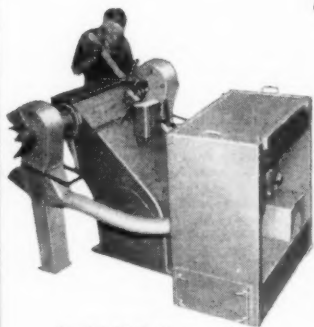
. . .

\* DUCTLESS DUSTKOPS can usually be installed in twenty minutes.

## STOP DUSTS

HOW? . . . with **DUSTKOP**

WHEN? . . . within 20 minutes\*



Model 1150 illustrated

■ **DUSTKOP** stops abrasive and fire-hazardous wood, rubber and similar combustible dusts. **DUSTKOPS** are firesafe. (Built of steel and non-inflammable spun glass). **DUSTKOPS** have high suction, big dust storage capacity, with space-saving compactness plus high efficiency dust separation. Unit-type **DUSTKOPS** save power: operate only when needed. Complete line of **DUSTKOPS** for all dusts.

Send Us the Details of Your  
Dust Problem \_\_\_\_\_

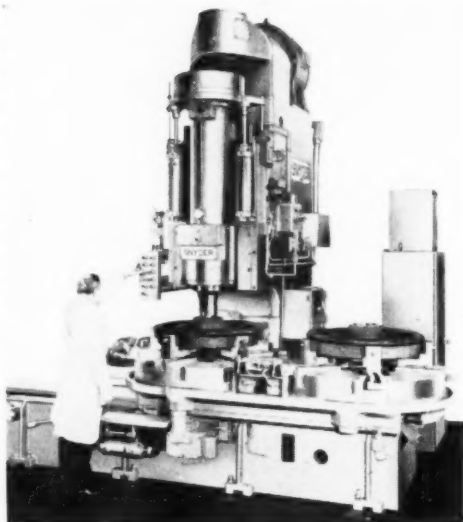
**AGET-DETROIT CO.**  
205 Main at Washington  
Ann Arbor, Michigan



## NEW SNYDER MACHINE FOR ROUGH BORING CAR WHEELS

A new machine which is claimed by its manufacturer to increase production 4 to 1 in rough boring railroad car wheels and similar large forgings and castings has been designed and built by Snyder Tool & Engineering Co. Developed especially for use in foundries and steel mills, this machine has the weight and rigidity required to assure maintenance of exact tolerances over an estimated machine lifetime of twenty years. While the unit shown is specifically applied to rough boring car wheels, a similar machine is available for finish boring on any type of large casting or steel forging.

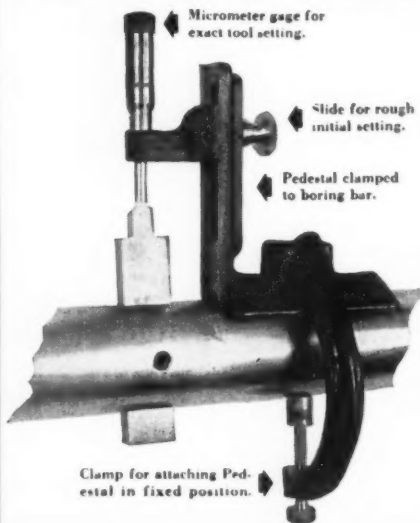
The machine has two stations and is equipped with a hydraulically operated shuttle slide which moves the workpiece from the loading station to the work station, then shuttles it beyond, to the unloading and reloading position. The fixture travels on auto-



## HERE IS A REAL TIME-SAVER!

... AND WORK-SAVER, TOO!

### *The Bartelt Pedestal Micrometer*



Enables you to set boring tools accurately from the bar diameter—eliminates common cut-and-try methods. Permits quick micrometer height measurements from flat or round surfaces. Can be used as a production-inspection tool with a wide range of settings. Ideal for jobbing shop and toolroom mechanics. Quality construction, moderately priced—sold direct-to-you by the manufacturer. All components precision machined of high grade materials and carefully assembled. Packed in carrying case with necessary accessories. Made in eight models for various applications. Write today for literature and direct-to-you prices.

**BARTELT ENGINEERING CO.**  
1218 PARTRIDGE AVE.

BELOIT

WISCONSIN

matically lubricated hardened and ground V-type ways, which allow for normal wear without developing side-play. The clamping is hydraulic.

A 75 h.p. motor is coupled directly to the geared and splined drive mechanism. Tungsten carbide tools are used in this particular application and remove 1" of stock from a 5 $\frac{3}{4}$ " diameter pierced hole 7 $\frac{1}{2}$ " long in a steel car wheel. Cutting time is 55 seconds per wheel. Any type tools may be used as required by the composition of the workpiece. Tool speeds range from 80 to 240 r.p.m., and feed speeds are infinite. Stroke is 14". Coolant system with pump can be supplied if required. Lubrication is automatic.

Operation is fully automatic and can be entrusted to unskilled help. Floor space required is 158" x 97". The column and base are welded steel and cast iron construction. Old equipment bored 6 to 8 wheels an hour. This machine bores 40 steel wheels or 70 cast iron wheels an hour, as compared to 6 to 8 per hour by old equipment. For further details, write:

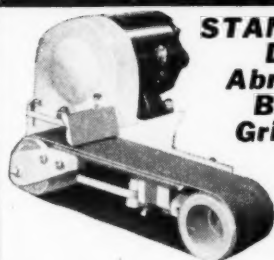
Snyder Tool & Engineering Co.  
E. Lafayette Ave., Dept. BB  
Detroit, Mich.

#### MULTIPLE UNIT OIL PURIFIER

A large size, multiple refill-type oil purifier, employing seven filtering units, is in production at Honan-Crane Corporation, a subsidiary of Houdaille-Hershey. Originally developed for large volume users of rolling oils in the aluminum industry, these "king-size" purifiers are specified for other industrial applications requiring large volume oil purification when floor space is at a premium.

The maximum capacity of this unit exceeds 2100 g.p.h. of 50 seconds viscosity color-clear oil on continuous circulation. It provides the highest flow rate consistent with maintaining clarity and low neutralization number of the oil.

Inside the steel shell of the new purifier, seven individual units are mounted on center tubes. Each unit consists of a perforated steel basket containing a



### STANDARD D-4 Abrasive Band Grinder

Famous  
for  
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 $\frac{1}{4}$ " band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

**WALLS SALES CORP.**  
306 E. 38th St., New York 16, N. Y.

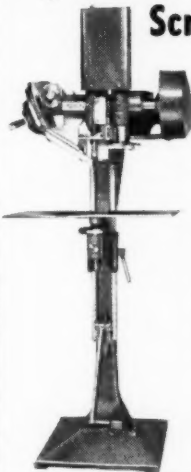
### Reynolds- Magazine Feed Screw Driving Machines

★

Simplify and  
Speed up those  
high production  
Assembly jobs.

A complete line of  
production type  
screw driving  
machines for every  
application.

WRITE FOR  
CATALOG

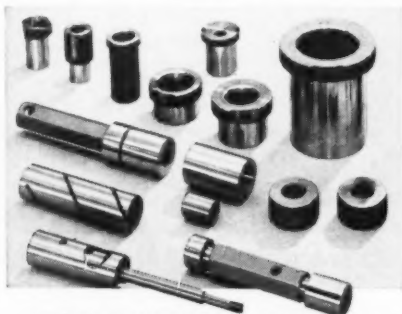


**COOK & CHICK CO.**  
640 S. MILLER ST. CHICAGO 7, ILL.

# DRILL JIG



## Bushings - Gages



### ECONOMICAL-ACCURATE

**IN STOCK**, ready for immediate delivery, all A. S. A. **STANDARD** types and sizes. Exceptionally fast delivery of **NEW GAGES** and Gages salvaged by **HARD CHROMIUM PLATING**.

*Bulletin and Price Lists  
sent promptly upon request.*

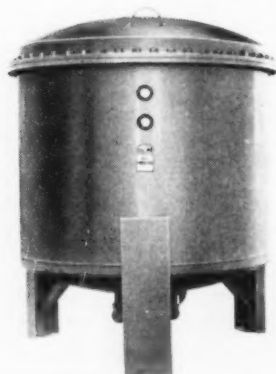
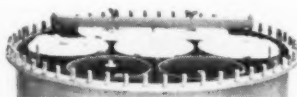
# *Economy*

**TOOL & MACHINE CO.**

1829 S. 68th St., Milwaukee 14, Wis.

cloth bag with a capacity of 104 pounds of Cranite, (specially processed fullers earth).

Due to the highflow characteristics, the new unit has a greater purification capacity than seven smaller purifiers containing an equal amount of Cranite, and operated in parallel. However, the big unit is much more compact than the seven individual units, being four feet in diameter and six feet high.



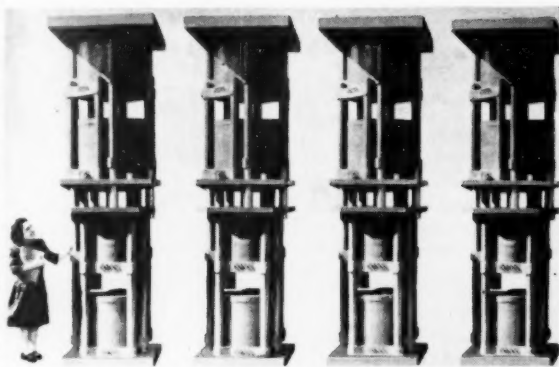
In operation, contaminated oil enters the inlet pipe and surrounds the filter baskets, then penetrates the cloth bag of the filter unit, and passes through the Cranite, the felt cover of the center tube, and a metal cloth screen which is an integral part of the center tube. The oil then rises to the top of the center tube and down the stand pipe to the clean oil outlet. The actual flow-rate of the purifier depends upon the viscosity of the oil, amount of contamination, and pressure drop through the unit of the oil being purified.

Detailed specifications may be obtained upon request. Write:

**Honan-Crane Corp., Dept. BB**  
911 Sixth St.  
Lebanon, Ind.

## EXTRA HEAVY DUTY DIE CUSHIONS

This new large die cushion design is now in production by the Dayton Rogers Manufacturing Co. It has an overall ring holding tonnage of 360 tons, developed by 100 p.s.i. shop airline. The four cushion units illustrated are mounted on a large straight side 2000-ton power press. They can be used on all deep drawing operations, and are adapted for the control of the die pressure pads on forming dies, together with the use of the ejector mechanism.



The cushions can be operated as individual units on a given press or piped in series, having a constant ring holding pressure on all four units when required. A combination reducing regulating valve is furnished together with a surge tank. The surge tank assures a

constant ring holding pressure throughout the draw work cycle. The unit as shown is known as a Model 4-CCCC-24-12. Write for complete details to the manufacturer:

**Dayton Rogers Mfg. Co., Dept. BB**  
2824 13th Ave., So.  
Minneapolis 7, Minn.

*It isn't polite to point,  
but....*

**Look at this!**

**T**HIS head has been designed mainly for high speeds, although it is also used for large cluster boxes on way type machines.

Designed to eliminate oil seals and other rubbing parts, it is fully ball bearing equipped. It contains an oil pump with a built-in trouble-free vane type pump, which pumps the oil to the top of the head and by centrifugal force spreads the oil over the entire upper surface of the head, then cascades down over the bearings and gears.

Ideal for high speed sensitive drilling machines, its castings are made of high-grade aluminum alloy. All spindles and shafts are made of alloy steel properly heat-treated and ground.



**34 Spindles in 6" Square**  
Oil circulating with self-contained pump,  
speeds in excess of 10,000 RPM.

IMMEDIATE DELIVERY!

We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.



SINCE 1915

**UNITED STATES DRILL HEAD CO. CINCINNATI 4, OHIO**

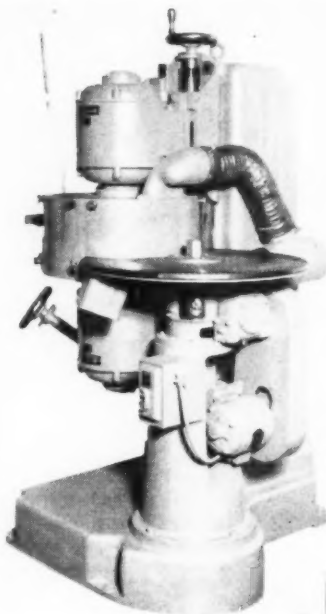
## BESLY DOUBLE VERTICAL SPINDLE GRINDER

Charles H. Besly and Company have recently completed shop tests on a new Double Vertical Spindle Grinder designed for faster precision grinding of small parts. This machine grinds wet or dry as fast as it can be loaded. With manual loading by a skilled operator, the new grinder has an output of 2,400 pieces per hour. With a hopper feed attachment the machine can produce 5,000 or more pieces per hour, depending upon the area of the pieces to be ground.

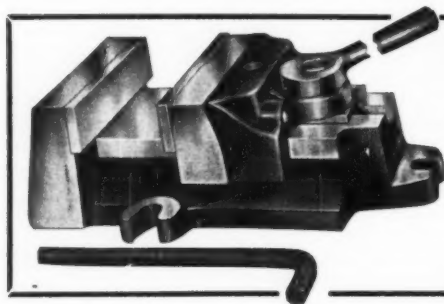
The new grinder, listed as No. 905, features quick convertibility from one job to another by easy replacement of the feed wheel. Fast gravity loading and unloading is obtained by the horizontal position of the grinder's feed wheel.

In addition to handling such varied types of production grinding as coil spring ends, carbon brushes, ceramics and plastics, the new grinder is adaptable to many other types of production grinding; these include a large variety of small steel, aluminum, copper, brass and gray iron parts.

The unit supplies the need for an in-



termediate vertical spindle machine that is capable of high production grinding of small parts at a new low cost per finished piece. Specifications include two 3 h.p. motors, 1750 r.p.m., on grinding heads; the overall length and width is 41 $\frac{7}{8}$ " and height is 66". A choice is provided of 15", 16" or 18"



### PLUNKET QUICK ACTION VISE for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws.

Eccentric motion moves jaw 5/16" Size

6" jaws, 1 $\frac{1}{2}$ " deep, opens 4".....\$63.00

Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses,

Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

J. E. Plunket Machine Co. 1823 W. Lake St.  
Chicago 12, Ill.

diameter abrasive discs. For detailed information, write:

**Charles H. Besly and Co., Dept. BB**  
118-124 N. Clinton St.  
Chicago 6, Ill.

#### OSTER GEARED PIPE THREADER

This new pipe threading tool is strongly built to withstand the strain when used with a drive shaft for power operation with a portable pipe machine. For hand operation the tool is used with a ratchet handle. Identified as "The Leader—No. 54", this geared re-eding die-stock has a drive gear with tensile strength of 40,000 to 60,000 pounds p.s.i. The steel pinion runs in needle bearings and is supported by a tubular steel housing. The pinion has machine cut teeth and is completely hooded.

The complete tool is furnished with four individual sets of dies, each set having five individual and replaceable segments. Each set of dies threads one pipe size only. The four standard pipe sizes are 2½", 3", 3½", and 4". The die holder is a separate unit and is adjustable to permit cutting oversize and undersized threads.



The lead screw is designed to prevent jamming when power-driven by an inexperienced operator. The universal chuck has three powerful, quick-acting, serrated jaws with a square head locking screw. Graduations on pinion shaft housing indicate the correct length of thread to be cut.

**The Oster Manufacturing Co.**  
2057 E. 61st St., Dept. BB  
Cleveland 3, Ohio

## Stand **EXTRA** Guard

**AGAINST THAT HUMAN ELEMENT**  
and **AGAINST MATERIAL WASTAGE**

with  
this



## BRINELL TESTING MACHINE

IT APPLIES LOAD AND REVERSES Automatically

● Model KDR—Brinell Testing Machine—for testing the hardness of metals and metal parts is capable of checking up to 800 pieces per hour and parts varying in diameter and thickness as much as ¾" without moving the elevating screw. Adjustable for two to fifteen seconds, it insures application of full load for required time cycle, then automatically reverses. Prevents waste of material due to improper loads. Equipped with a comparator indicator which makes the use of the Brinell microscope unnecessary on production testing. Has many other valuable features. Write for descriptive pamphlet.

Let us solve your **TESTING PROBLEM**

**Steel City**  
**TESTING MACHINES, INC.**  
8837 LIVERNOIS AVE., DETROIT 4, MICHIGAN

The Bendmore handles material up to  $3/32$ " thick a full 12" wide. Good clean bends up to  $135^\circ$ . The machine is ruggedly constructed of semi-steel castings, the operating cam and steel insert in ram are heat treated to resist wear and give long life. Prompt delivery.

Write for literature. Dept HB

**Carl Wirth & Son**

1625 CLINTON AVE. N.  
ROCHESTER 5, N. Y.

**Bendmore**

SELF ADJUSTING  
BENDING MACHINE



#### NEW O'NEIL-IRWIN DI-ACRO RADIUS BRAKE

The Di-Acro Radius Brake No. 4, a recent development of O'Neil-Irwin Manufacturing Co., was designed as a precision machine capable of forming duraluminum, chrome molybdenum, rust resistant and spring tempered alloys and other low ductile materials used in the fabrication of a wide variety of products. It is actually a double-purpose machine, since in addition to its radius forming function, it will also form sharp "no radius" bends, such as are usually obtained with a standard style brake.

The new Radius Brake is claimed to eliminate the possibility of fracture or disintegration developing at the line of forming, which tendency is inherent in alloys of low ductility when cold drawn forming is attempted without provision for the establishment of the exact radii necessary in accordance with the ductile limits of the material. Obtainable radii are in accordance with the standards recommended by the U. S.

Army Air Corps for different thicknesses of these low ductile alloys.

Case hardened and spring tempered



materials that must be formed after heat treating can also be worked to accurate dimensions with the Di-Acro



**Kutmoré**  
HIGH SPEED  
ADJUSTABLE  
HOLLOW MILLS



Designed for modern production requirements. Saves time, effort and motion. Has a two way micrometer adjustment with locking device to assure absolute cutting accuracy.

Kutmoré Hollow-Mills may be had with straight or taper shanks, high speed or Carbide Tipped blades. Insist on Kutmoré for accuracy, speed and economy. Prompt delivery. Write for Catalog No. 15.

**Carl Wirth & Son**

1625 CLINTON AVE. N.  
ROCHESTER 5, N. Y.

Radius Brake. The radius used in each case must be sufficient to provide uniform expansion of the material surface where the fold occurs. If the radius is correctly established, the possibility of fracture in the material will be prevented.

The unit's flexibility makes it useful for testing and determining ductile qualities of a wide variety of alloys and substances. It is adaptable to a wide range of laboratory and experimental research work. The specifications include a material capacity of 16-gauge (.062") sheet steel; heavier gauges of narrower or more ductile materials can be formed in proportion. The brake will form material up to 24" in width, up to a range of 125°. For complete data, write:

O'Neil-Irwin Mfg. Co., Dept. BB  
314 Eighth Ave.  
Lake City, Minn.

**THE UNIVERSAL SCREW STARTER**

Geo. P. Heller Company offers the Universal Screw Starter for assembly lines, mechanics and service men.

The name "Universal" is especially significant in this usage, since these starters are effective on slotted, Phillips, and all special screw heads with the holding mechanism within the screw slot; they are thus applicable for counter-sunk screws. Dual bits rotate in opposite directions upon handle pressure to hold screws by friction grip within the screw's slot. The holding grip is increased with increased pressure on handle. A release mechanism in the handle-butt permits free disengagement.

Universal Screw Starters are made in 3 lengths: 5", 8", 11", medium and light dual bits, with both insulated and plain shafts. For complete details, write the manufacturer:

Geo. P. Heller Co., Dept. BB  
2019 Grand Ave.  
Kansas City 8, Mo.

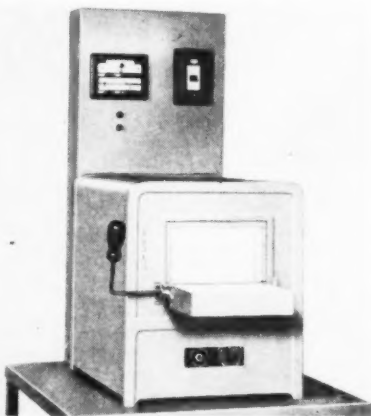
## LABORATORY MUFFLE FURNACES WITH BUILT-IN POWER MODIFIER

A new line of Laboratory Muffle Furnaces is designated as Type MM, incorporating a selective power modifier, is offered by the Cooley Electric Manufacturing Corporation. The unit is essentially a synchronous motor-driven variable cam, which operates an "on" and "off" switch once each minute. The only power consumption is in the motor drive. The cam position controlled by the setting knob permits varying the intervals so that any power input from 5% to full power may be obtained. Control is obtainable from about 300° F. to furnace maximum.

The Model MM Furnaces are offered in five models, operating at maximum temperature of 1750° to 2000° F., with inside dimensions varying from 4" x 3" x 8" up to 10" x 6" x 18". They are designed for use in experimental testing, fusing, igniting, precipitate drying and ashing in physical and chemical laboratories, and as pilot furnaces in metallurgical laboratories. In metallurgical testing, the low range is useful for critical tempering, the manufacturers state, as well as for the various laboratory procedures requiring such low temperatures.

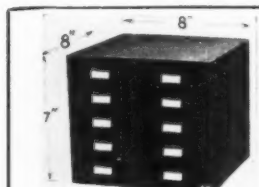
The line is further augmented by the Model ACL and ACH Recirculating Air Furnaces, the first designed for operation to 900°, the second for temperatures to 1200° F. In both units a temperature uniformity of 5° accuracy tolerance is maintained by means of the integral selective power modifier, used in conjunction with an indicating-controlling pyrometer. This accuracy

is held at temperatures as low as 300° F. The modifier corrects power input to prevent temperature overshooting beyond the set point when using a controlling pyrometer.



An impeller type fan, mounted below the perforated metal hearth plate, forces air up between the heating units and vertical baffles which are located at either side of the furnace chamber. The air then circulates down through the work and back to the fan in a steady flow, assuring rapid and uniform heating of the charge.

Having the accuracy required in all low temperature operations, the Recirculating Air Draw Furnaces may be used for tempering or drawing of both



Pat. Pend.

Each cabinet is equipped with rubber pads to prevent marring and slipping when used singly or when stacked.

**CRESTE METAL PRODUCTS COMPANY, INC.**

**STEGE, ILL.**

## TEN DRAWER SMALL ARTICLES CABINET

An excellent investment—Olive Green Baked Enamel Finish.

Inside Drawer Dimensions—  
3 3/8" Wide, 1-3/16" High and 7 7/8" Long.

PRICE \$5.29 DELIVERED

An all steel No. 24 Ga. ten drawer small articles cabinet designed especially to fit the needs of those having many items they want at their finger tips.

The unique interlocking construction makes it possible to offer a neat (no unsightly spot welds) cabinet with ten individual free-sliding drawers at a nominal cost.

Each drawer has a combination drawer pull and label holder for indexing contents to insure against loss of items, saving searching time and replacement cost.

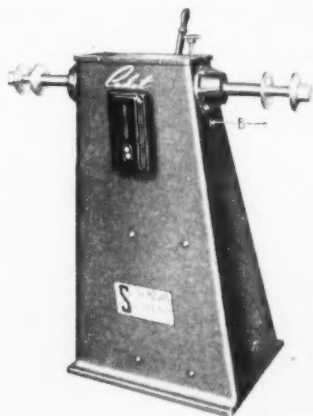
carbon and high speed steels, non-ferrous heat treating, etc. They are also useful for tool and die tempering, and particularly for high speed steel tools, since furnace recovery time is rapid and the double temper of high speed steel is obtainable.

Cooley Furnaces are offered with indicating pyrometer for wall mounting or in a completely wired panel, the entire unit forming an integral part of the equipment when assembled. For complete specifications on these new units, write the manufacturer:

Cooley Electric Mfg. Corp.,  
38 So. Shelby St., Dept. BB  
Indianapolis 7, Ind.

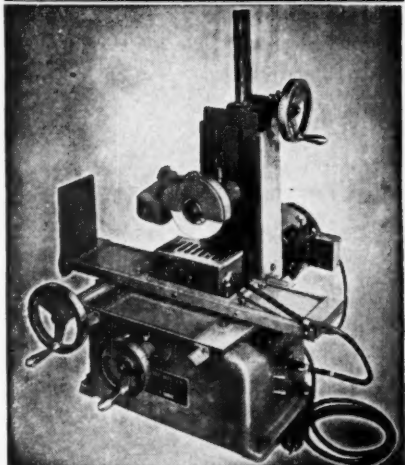
#### STANDARD COMPACT CADET BUFFER-POLISHER

To serve a wide variety of industries with a quality buffing and polishing machine, the Standard Electrical Tool Co. have developed their self-contained belted motor driven Cadet Buffer-Polisher.



The ball bearing motor is mounted on an adjustable base inside the pedestal. Power is transmitted to the work spindle through a multiple V-belt drive. The ball bearings are fully protected and give ample support to the heavy extended spindle. The distance "B" from the base to the inside of the wheel is 8½".

# SANFORD



## High-Speed BENCH SURFACE GRINDER

ACCURATE WITHIN .0001

A sensitive machine built to rigid standards of accuracy and workmanship specially designed "For the job that fits in your palm."

WRITE FOR BULLETIN

**SANFORD MFG. CO.**  
1020-28 Commerce Ave.  
Union, N. J.

# MULTIPLE DRILLING with a . . .



## MULTI-DRILL

**Increases Capacity  
Up to 800%**

**ADJUSTABLE TO ANY HOLE PATTERN  
FITS ANY DRILL PRESS**

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern — is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as  $\frac{1}{8}$ " — handle drill sizes up to  $\frac{3}{4}$ " in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

**COMMANDER MFG. CO.**

4227 West Kinzie St.

Chicago 24, Illinois

**Product of *Commander* — Builder of the *Commander Tapper***

Optional equipment includes a shaft lock for use in changing wheels, and a hand brake for quickly stopping the spindle. The standard spindle speed is 2400 r.p.m., but any other spindle speed is available. The unit is also furnished with two speeds. For complete details, write the manufacturer:

**Standard Electrical Tool Co.  
2486 River Road, Dept. BB  
Cincinnati 4, Ohio**

governor which assures constant speed under load.

The illustration shows one of the new medium-duty sanders being used to line



### BUCKEYE PORTABLE VERTICAL SANDER

A new vertical sander, weighing only 8 lbs., 7 oz., with an overall height of only 7", is announced by Buckeye Tools Corporation. This latest addition to the Buckeye line of air and electric powered portable tools is a medium-duty model, suited for precision work because of its unusual ease of handling.

The tool is also designed for use as a grinder with cup-type, counter-bored center wheels and cup wire brushes. It is available in free speeds of 4500, 5500, 6000, 7200 and 8500 r.p.m. It is equipped with the "Stream-Power"

up the doors of a safe, an operation typical of the many uses to which this compact, portable air tool is adapted. For complete specifications, write the

**Buckeye Tools Corp., Dept. BB  
Dayton 1, Ohio**

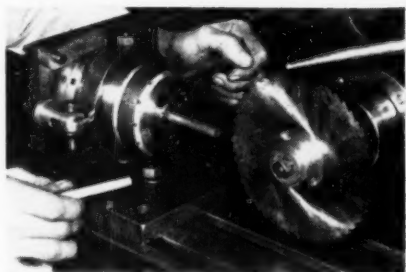
### COLLET CHUCK MILLING AND SLOTTING OPERATIONS

The Goodwin Manufacturing Company has introduced an improved quick-acting collet chuck that is suitable for use on milling machines. The chuck can be mounted on index plate in vertical or horizontal position for semi-automatic milling and slotting operations.

The chuck shown in illustration is mounted on an angle plate to permit the slotting of a  $\frac{3}{8}$ " x  $2\frac{1}{2}$ " pivot pin to a depth of  $2\frac{1}{8}$ ". This means the Goodwin chuck is holding the pin by only  $\frac{3}{8}$ ".

Fabricated of hardened and ground precision-made parts, the Goodwin quick-acting chuck requires little maintenance, and can be operated by unskilled workers. The chuck is available with either 1" or 2" capacity. It utilizes a multiple leverage principle and the cantilever action of hardened steel fingers; it provides a positive, vise-like grip on the workpiece. The

threaded nose cap can be removed easily to facilitate collet or can be turned to adjust collet gripping pressure. Pres-



sure setting is locked by a key that engages a spring in the engraved slots on the inner surface of adjusting collar.

**The Goodwin Mfg. Co., Dept. BB**  
10 East Broadway  
Cuyahoga Falls 7, Ohio

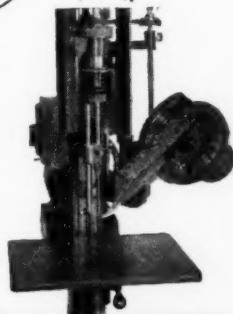


**LADY MACHINE OPERATORS,** You don't want to lose the charm and loveliness of your hands through cuts, scratches, dirt, resulting from the out-of-date hand method of driving screws . . . and **MANAGEMENT,** you don't want to make your plant a first-aid station. Eliminate all this by installing **DETROIT POWER SCREWDRIVERS**, the modern hopper-fed machines that do the dirty work without the hands coming in contact with the screws.

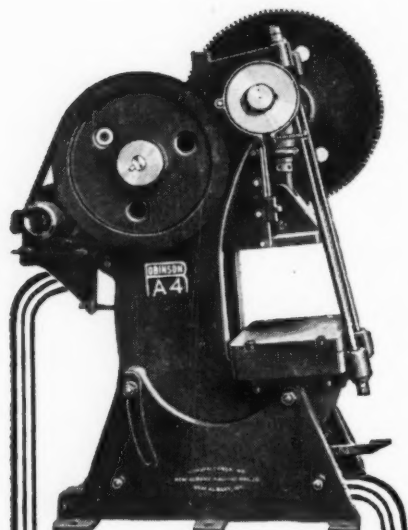
There are three models to drive screws from No. 2 to  $\frac{5}{8}$ " at the remarkable speed of one a second. Send sample assembly for estimate.

**WRITE FOR CATALOG.**

**DETROIT POWER SCREWDRIVER CO.**



2809 West Fort Street,  
Detroit 16 • Michigan



## *The* **ROBINSON** *Inclinable* **PUNCH PRESS**

*The* new and improved Series A Robinson Punch Press is noted for safe, dependable operation. Sturdily built and employing finest construction features, a Robinson Series A offers years of trouble-free operation at minimum maintenance cost. Five sizes now available for immediate delivery.

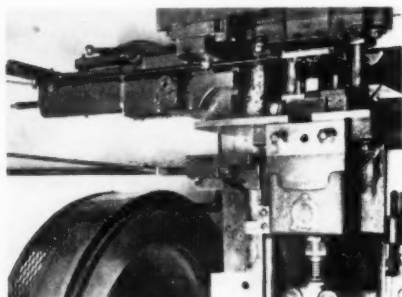
**New Albany Machine Mfg. Co.**  
NEW ALBANY, IND.

**ROBINSON**

*Inclinable*  
**PUNCH PRESSES**

### **NEW AUTOMATIC PUNCH PRESS FEED**

A compact new punch press feed, designated as the Rol-Di-Feed has recently been introduced by the H. E. Dickerman Manufacturing Co. This self-contained, cam driven feed may be quickly installed on the press bolster, and in some cases, directly on the die shoe, to feed stock to the press in any desired direction. The Rol-Di-Feed is



of open side design, and can, therefore, feed strip materials, such as metal, fibre, paper, mica, plastics, etc. in nearly any width, and in continuous coils or in short lengths.

Feeding throughout most of the 360° of press shaft rotation, the new unit advances stock over the die at a relatively slow rate of speed, resulting in increased accuracy of feed length when feeding simple piercing and blanking, compound or progressive dies operating at high speed. The manufacturers state that the Rol-Di-Feed is particularly suited to feeding of deep drawing or forming dies where a large part of the press stroke is used for drawing or forming and only a small part of the total stroke remains available for feeding purposes.

The maximum feed length is 9" on presses having 3" or more of stroke, and approximately three times the stroke for press strokes under 3". The feed length is adjustable in increments of .001". The new unit requires a 3" x 9" mounting space for the feed; for the cam, a space 2" x 2 7/8" is needed. The

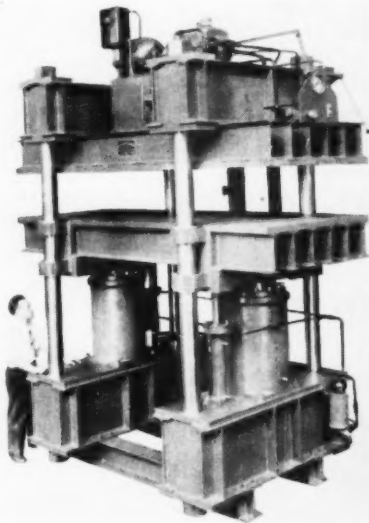


unit measures 22" long, 12" wide, 7" high. For complete information, write:  
**H. E. Dickerman Mfg. Co., Dept. BB**  
**321 Albany St.**  
**Springfield, Mass.**

#### **R. D. WOOD SPECIAL FORMING PRESS**

Especially designed for the forming of special signs, this 350-ton Wood Hydro-Lectric Forming Press has already demonstrated its versatility in special fields requiring dependable press action.

Adjustable in tonnage between 85 and 350-tons, the press is complete with motor-driven pumping unit, control valves and piping, with pump volume and press speeds adjustable from zero to maximum. The pumping unit, essentially composed of a 14.7 g.p.m., 2,000 p.s.i. radial piston pump driven by a 15 h.p. electric motor, is mounted on the top platen.

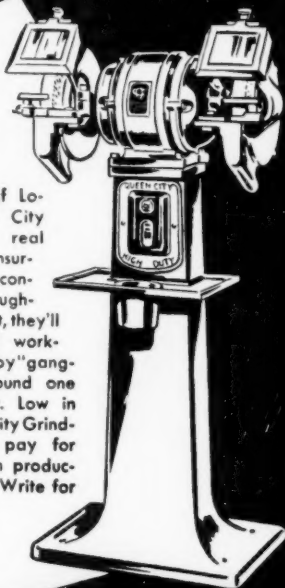


The press is made in models, sizes and capacities to meet all requirements. For detailed specifications and performance data, write:

**R. D. Wood Co., Dept. BB**  
**Public Ledger Bldg.**  
**Philadelphia 5, Pa.**

## **SAVE TIME, MONEY**

**with rugged  
 QUEEN CITY  
 GRINDERS**



A battery of Low-Cost Queen City Grinders is real production insurance. Placed conveniently throughout your plant, they'll stop wasted work-hours caused by "ganging up" around one lone grinder. Low in cost, Queen City Grinders quickly pay for themselves in production gained. Write for Catalog.

## **QUEEN CITY**

### **MACHINE TOOL CO.**

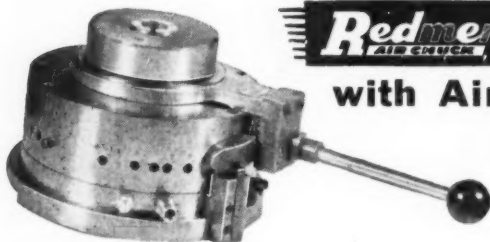
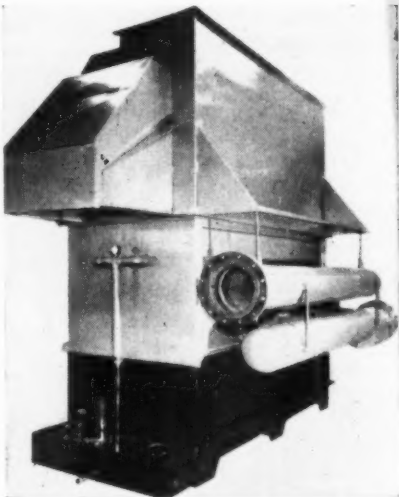
**235 E. 2nd St.**  
**CINCINNATI 2, OHIO**



## NEW EQUIPMENT PREVENTS WATER CONDENSATION IN AIR LINES

Illustrated is the new model of the Niagara Aero After Cooler, simplified in construction and protected from freezing in outdoor installation. This equipment dehydrates compressed air or gas, by cooling it to a temperature below the dry bulb temperature of the atmospheric air, thereby removing the moisture that condenses at that point and preventing further condensation of water in air or gas lines in use. This is done by evaporating a recirculating water spray on the surface of the coil through which the compressed air passes, creating a temperature close to the wet bulb temperature of the surrounding atmosphere and lower than the dry bulb temperature and also below the summer surface water temperature.

In the new unit, protection against freezing is given by the use of the "balanced - wet - bulb" control. A thermostat in the spray water reservoir is set for a desired low temperature limit, at which it operates dampers



RC-5



## Index Chuck with Air Operated Collet

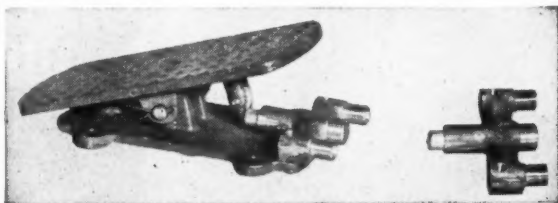
The REDMER INDEX CHUCK has twelve indexing positions and Collet capacity 1/16" to 2". REDMER CHUCK can be had with either Index Collets or Standard Brown & Sharpe type collets.

No. FC-28

V-29

## Air Foot Control and Valve

The REDMER FOOT CONTROL & VALVE was developed in order to meet a demand for an AIR VALVE & FOOT CONTROL LOW IN COST but constructed to surpass the high priced Valves.



**REDMER AIR DEVICE CORP.**  
GUNTERVILLE, ALABAMA, BOX 247

to recirculate the air stream internally around a division plate in the center of the unit, instead of drawing in freezing air. This permits outdoor installations, to save space and give the benefit of the lowest wet bulb temperature in summer and provide cleaner air for the benefit of easier maintenance. The Aero After Cooler consumes less than 5% of the cooling water required by conventional coolers. Prevention of condensation in air lines saves water damage to air tools, paint sprays or materials in process. For complete information, write:

Niagara Blower Co., Dept. BB  
405 Lexington Ave.,  
New York 17, N. Y.

#### NEW BRADFORD DISC SANDERS

The Bradford Machine Tool Company has recently added a 7" Heavy Duty, and 9" Standard Duty Portable Electric Disc Sander to their line of "Metalmaster" tools.

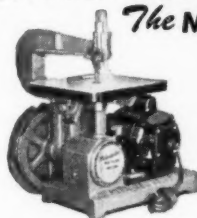
The new models are designed with vertical-type spindle construction. The user can reach into difficult places encountered in sanding and finishing auto bodies, machinery, etc., with greater ease than is possible with conventional right angle type disc sanders.



These new "Metalmaster" Disc Sanders are provided with a rear grip, which is positioned to maintain correct balance in any working position. The side handle is removable, and can be attached to either right- or left-hand sides to suit the operator. Trigger

## CUT TOOL and DIE MAKING COSTS 40 to 60%

...with these 2 MACHINES



### The MILWAUKEE DIE FILER

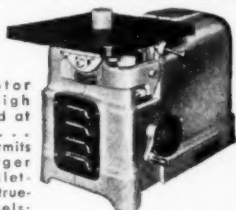
Model FS with new All-Purpose, Deep-Throated Overarm performs all tool and die-making operations efficiently, at low cost.

Files, saws and lapping sticks chucked at upper end. Spring tension adjusted in overarm chuck. Chucking close-to-work assures rigidity of saws and files. Table tilts 15° in four ways. Lower chuck has ball-jointed jaw for true alignment of files with crooked shanks.

### The MILWAUKEE PROFILE GRINDER

Built for Precision Grinding

Available in two models — STANDARD and HIGH SPEED . . . for mounted stone wheels and diamond or carbide wheels respectively. 1/2 H.P. Ball Bearing Motor maintains high spindle speed at Full Capacity . . . no stalling. Permits use of larger wheels. Collet-Chuck assures true-running wheels; permits fast, easy mounting or removal of wheels. Built-in Diamond Wheel Dresser always ready — no loose parts to assemble. Write for Bulletins and name of nearest dealer



#### RICE PUMP & MACHINE CO.

Division of Milwaukee Chaplet & Mfg. Co.  
1027 S. 40TH STREET • MILWAUKEE 4, WIS.

# MILWAUKEE

DIE FILERS • PROFILE GRINDERS



**Fingertip  
Precision**

**Production  
Speed**

**Lyon**  
**INTERNAL  
GROOVING  
TOOL**

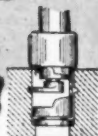
Saves costly preparation time — precision grooving of single or multiple grooves at a production rate — low initial cost, has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

**SEND FOR CATALOG**

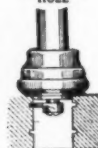


**LYON MACHINE CO.,  
WORCESTER 3, MASS.**

*Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.*



GROOVE  
LOCATED FROM  
BOTTOM OF  
HOLE



SINGLE GROOVE  
LOCATED FROM  
TOP OF HOLE

switch has positive lock for continuous operation. A spindle lock is provided for quick, easy pad change.

Both models are powered with a universal 110 volt a.c.-d.c. motor, which drives the tools at 5200 r.p.m., no load speed. Heavy duty ball bearings are used throughout. All gears are made of alloy steel, hardened, helical cut, and amply lubricated. A lightweight aluminum housing completely encloses the tool. Net weight of the 7" Model 207 Heavy Duty Disc Sander is 10 lbs.; the 9" Standard Duty Model 209, 11 lbs. Equipment furnished includes 15 ft. of rubber covered three-conductor cable with plug and cable strain reliever; one backing pad; three sanding discs.

An illustrated bulletin giving complete specification and construction details on the two "Metalmaster" Disc Sanders is available upon request.

**Bradford Machine Tool Co.  
Dept. BB  
Cincinnati, Ohio**

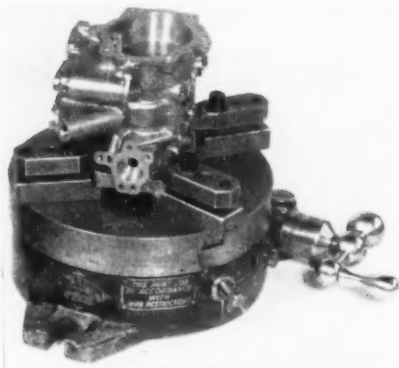
**"ROCKFLUX" FOR INDUSTRIAL FLOOR  
ECONOMIES**

Research and development have opened the way to new savings and convenience in industrial floor patching with "Rockflux" product of the Flexrock Co. Where applications formerly required  $1\frac{1}{8}$ " to 2" thickness, the improved product now need only be put down  $\frac{1}{2}$ " thick. This results in less weight on the floor understructure, less material required, and quicker application. "Rockflux" is a combination of donerite and quartz, fluxed with a cement. The flux is almost zero in calcium and other substances reacting to acids, and is highly acid resistant. Areas paved with "Rockflux" are ready for any traffic the day after application is completed, according to the Flexrock Co. The surface presented is unaffected by oil and grease and permits free and easy rolling of equipment because of high pressure resistance, three times that of ordinary concrete. For descriptive folder, write:

**Flexrock Co., Dept BB  
Filbert & Cuthbert Sts.  
Philadelphia 4, Pa.**

## PRECISION CLAMPS FACILITATE SET-UPS

The Precision Clamp, a recent development of the Kellner Tool & Machine Co., is a useful device which is stated by its manufacturers to cut down



set-up time, thereby stepping up production. It assures positive clamping of all materials for clamping on lathes,

milling machines, planers, index tables, shapers, grinders, etc.

The Precision Clamp relieves stress on tables, and is simple to operate, since no parallels nor clamping blocks are required. Using Precision Clamps as shown in the illustration holding the carburetor part, the rotary index table does not bend nor buckle, and the slots are not damaged by the strain.

By fastening the base of the clamp to a face plate, securing the work to clamps, then with the work securely held in place, the clamps can be moved to any position desired. To clamp additional work, it is not necessary to loosen the clamp base; the top part of the clamp only is loosened, the finished part is removed, and the next piece is then clamped in place by tightening the bolts, which pulls the top part of the clamp into the same locating position. For complete specifications, write:

Kellner Tool & Machine Co.  
18490 Mt. Elliott Ave., Dept. BB  
Detroit 34, Mich.

# 441 STANDARD SIZES

PRECISION GROUND FLAT STOCK

## WORLD'S LARGEST RANGE OF SIZES

3

KINDS

**WATERcrat**

**OILcrat**

**AIRcrat**

*Royal Velvet Finish*

The ARISTOCRATS of  
GROUND TOOL STEEL

*Write FOR FREE CATALOG*

**MARSHALL STEEL CO.**  
**LISLE, ILLINOIS**  
**BOX 58B**

## THE New MODEL 1100 HYBCO TAP GRINDER



- Capacities No. 2 Mach. Screw to 1½" Hand Taps.
- All Settings Adjustable To Give Any Angle—Relief—Hook.
- Taps Held In Precision Collets Can Be Sharpened After Center Is Destroyed.
- Standard Motor—Any Current Specification.

*Representatives In Principal Cities*

**HENRY P. BOGGIS & CO.**

1279 West 3rd Street  
Cleveland 13, Ohio

## CLARK INTRODUCES NEW ROCKWELL HARDNESS TESTER

A new and improved "Rockwell" Hardness Tester offering an ease and simplicity of servicing claimed never before available in this field is announced by Clark Instrument, Inc.,



Identified as Clark Hardness Tester Models C-8A, C-12A, and C-16A, the new instrument features a spindle housing and beam assembly that may be replaced by the owner himself, regardless of his location, without requiring special skill or special tools.

Other advantages claimed for this unit include a frictionless spindle, more positive tripping, and light weight. The body of the tester is cast in aluminum, and weighs from 65 to 85 pounds less than similar units made from steel or cast iron. The frictionless spindle is an exclusive Clark feature that assures a correct minor load every time, according to the manufacturer. The positive tripping feature is said to overcome the danger of an incorrect major load being caused by friction or drag of the tripping lever on the loading beam.

The Clark Hardness Tester is used for

"Rockwell" testing of hard or soft steel, brass, aluminum, cast iron, copper, other metals, alloys, and plastics. For information, write:

Clark Instrument, Inc., Dept. BB  
10200 Ford Road  
Dearborn, Michigan

# MEAD AIR HAMMER HAS 7½-TON IMPACT CAPACITY

Another new Impact Air Hammer has just been announced by Mead Specialties Company. The Model No. 105, illustrated, has a capacity of approximately 15,000 pounds at point of impact. The working surface of the table



measures 7" x 9"; the over-all height is 44½"; throat depth is 4½"; maximum daylight opening is 18", and the maximum stroke is 8".

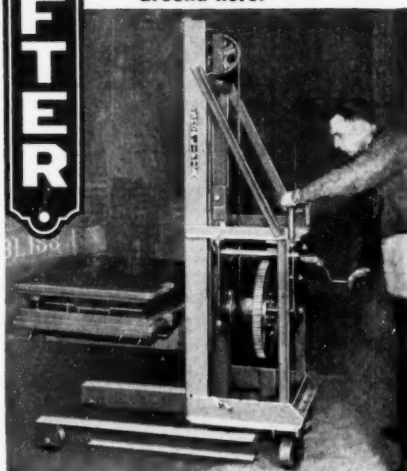
Write for complete description of Model No. 105 and other Impact Hammer models, also new Mead Air Power Catalog describing air-operated cylinders, presses, workfeeders, vises, clamps, valves, etc.

Mead Specialties Co., Dept. IH-6  
4114 No. Knox Avenue  
Chicago 41, Ill.

# SHOPLIFTER



... let an Economy SHOP-LIFTER do the heavy work around here.



Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOP-LIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

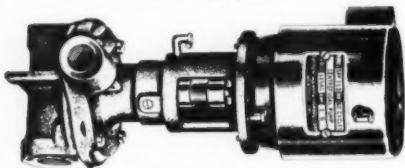
|                                    |          |
|------------------------------------|----------|
| <b>500 pound capacity</b>          |          |
| Type D, hand operated.....         | \$157.50 |
| Type DE, electric 1/3 HP unit..... | \$315.00 |
| <b>1000 pound capacity</b>         |          |
| Type DX, hand operated.....        | \$320.00 |
| <b>2000 pound capacity</b>         |          |
| Type DX, hand operated.....        | \$370.00 |
| Floor lock to hold machine steady: |          |
| \$10.00 extra for 500 pound sizes; |          |
| \$15.00 extra for type DX models.  |          |

ECONOMY ENGINEERING COMPANY  
4505 W. LAKE STREET • CHICAGO 24, ILL.



### SUTTON CENTRIFUGAL PUMP HAS WIDE INDUSTRIAL USE

A single stage, self-contained pumping unit for continuous operation in many applications requiring economical transfer of various liquids, is the compact Sutton bronze centrifugal pump, Model SPF-110. It is designed for use in closed pressure systems, and is rugged enough to withstand the destructive action of abrasive liquids.



Many laboratory, commercial and industrial uses have been found for this sturdy device which weighs less than 14 pounds and stands only 11 1/4" high overall. A patented rotary seal replaces the usual stuffing box, and the shaft is mounted on two pre-lubricated ball bearings. This pump operates in what-

ever position it is mounted, and may be throttled to maintain desired flow. Driven by a 1/25 h.p. motor, its capacity is 7 1/2 gallons per minute at a head of two feet; 4 1/2 gallons per minute at a 6-foot head, and 1 1/2 gallons per minute against a 9-foot head.

The Model SPF-110 and other small bronze pumps are fully described in Catalog No. 481, available upon request to the manufacturer. Write:

**Sutton Manufacturing Corp.**  
Dept. BB  
Norfolk, Virginia

### CLEVELAND BIN SHAKE-OUT VIBRATORS

Designed for installation on most types of hoppers and storage bins, type "F" Cleveland pneumatically-operated vibrators deliver hammer-like blows to prevent the arching-over and plugging of sand, coal, grain, ore, lime slag and chips in bins of capacities from one to several hundred tons. This standard line of vibrators consists of six sizes,

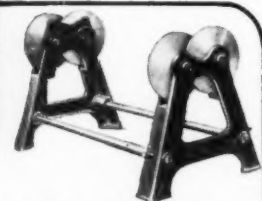
## SELECT THE BEST... Balancing Tool for Your Work from Sundstrand's Complete Line

Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart at right.



### FREE ADDITIONAL DATA

You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin No. 482.



### CAPACITIES

| Swing  | Between Standards | Weight Capacity |
|--------|-------------------|-----------------|
| 21 in. | 20 in.            | 12 lbs.         |
| 21 in. | 20 in.            | 800 lbs.        |
| 43 in. | 29 in.            | 800 lbs.        |
| 43 in. | 29 in.            | 2,000 lbs.      |
| 6 ft.  | 5 ft.             | 5,000 lbs.      |
| 8 ft.  | 8 ft.             | 10,000 lbs.     |
| Any    | Any               | 24,000 lbs.     |
| 43 in. | 30 in.            | 800 lbs.        |

**SUNDSTRAND**  
**MACHINE TOOL COMPANY**  
2535 Eleventh St. Rockford, Ill., U.S.A.



## Why a *Commander* Tapper?

- **Tapping capacity** 0 to  $\frac{3}{4}$ " with one tapper.
- **Torque control**—may be adjusted to protect any size tap. This assures safe bottom-hole tapping.
- **Spring clutch** drive eliminates slippage and wear . . . provides smooth, quiet, positive operation.
- **Compactly built**—affords maximum visibility of tapping operation.
- **Furnished to fit any Drill Press.**

*Write for circular and name of your nearest Distributor.*



**One COMMANDER  
TAPPER handles  
the range #0 to  $\frac{3}{4}$ "**

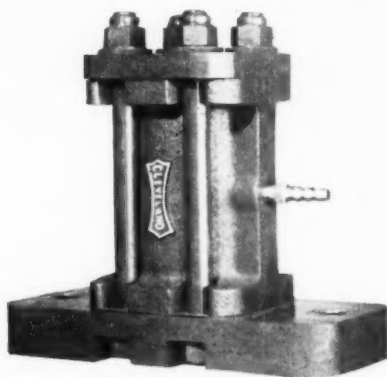
**COMMANDER MFG. CO.**

4227 W. Kinzie Street Chicago 24, Ill.

**Product of *Commander* . . . Builder of the *Multi-Drill***

which assure constant flow of materials as well as eliminating the need for manual pounding.

Type "F" vibrators are suitable for



either intermittent or continuous duty. Vibration is developed by the oscillation of a hard-chrome-plated heat-treated

solid steel piston which travels the length of a cast semi-steel cylinder body under air pressure. The vertical construction of these units permits their operation in any position so that piston movement can be at right angles to the direction of flow of materials handled.

Cleveland type "F" vibrators have piston diameters from  $1\frac{1}{4}$ " to 4", overall widths from 3" to  $7\frac{1}{2}$ " and overall lengths from 6" to 15". Heavy-duty models can be furnished upon request. Speeds of operation range from 2100 vibrations per minute on the smallest model to 750 vibrations per minute on the largest model, when used on standard line pressure of 80 pounds p.s.i. Speeds vary with line pressure maintained.

Write for Catalog No. 104 for additional information, to:

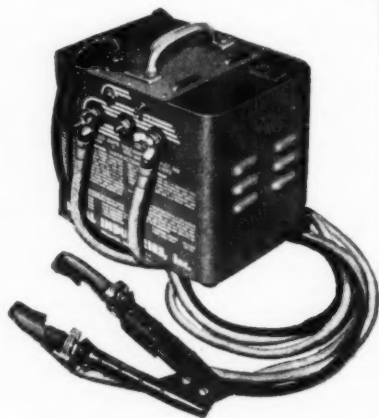
**Cleveland Vibrator Co., Dept. BB  
2764 Clinton Ave.  
Cleveland 13, Ohio**

### NEW 450-WATT THERMO-GRIP SOLDERING SET

Ideal Industries, Inc., announce a new light duty "Thermo-Grip" Soldering Tool that operates on the resistance heating principle. Touching the work with the soldering tool completes the secondary power circuit and causes the part touched to heat almost instantly. A thumb switch permits close heat control. The "Thermo-Grip" unit conserves power, drawing current only when the soldering tool is in direct contact with the part to be soldered. It is useful in inaccessible places and inflammable surroundings.

A complete set of soldering tools or attachments for handling all types of work includes a plier attachment for sweating and unsweating copper tubing, soldering lugs, terminals etc.; a "fork" attachment with two 3" electrodes for reaching into restricted places such as switch boxes, electrical tools and equipment; a "pencil" attachment with one 3" carbon electrode for spot soldering, and light seam soldering. These attachments have lightweight, phenolic

handles, designed for a cool, sure grip. The 450-watt "Thermo-Grip" Power Unit and Carrying Case measures 9½" x 6" x 8¾" including storage space for attachments, and weighs only 16 lbs. There are two soldering heats,



5.3 volts and 4.2 volts. The unit is equipped with an "on" and "off" switch and a pilot light to indicate when current is on. Further details will be supplied on request. Write:

**Ideal Industries, Inc., Dept. BB**  
Sycamore, Ill.

### ★ THE ★ WONDER CUTTER

The lowest-priced wire and rod cutter on the market. The hardened cutters last indefinitely.

Hand operated. A giant for work, cuts wire and rods up to ¾-in. round or ¾-in. square and band iron up to ½ in by 2-in. Adjustable stop for repeated cuts to same length. Large or small your shop can use a WONDER CUTTER.

Write today for prices.

**THE FEDERAL FOUNDRY SUPPLY CO.**

4602 East 71st St.,

Cleveland, Ohio



### GROB VERTICAL CUT-OFF MACHINE

Grob Brothers introduce a vertical type cut-off machine with a capacity of 18"x18". Vertical cutting makes it possible to cut out sections from plates, permitting closer adjustment of saw guides to work and facilitating placing material into the machine.

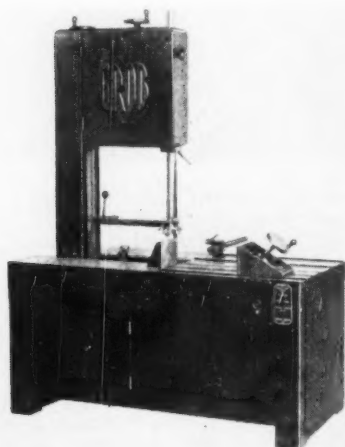
The base and the frame, as shown in the illustration, are made of formed and welded heavy gage steel. The frame, on which two 18" dia. saw wheels are mounted, travels on rollers. Tracks are provided in the base of the machine one of which has a V-groove in the rollers, assuring accurate straight movement of the frame.

The cutting cycle of the machine is

grip.  
power  
9 1/2"  
pace  
16  
eats,

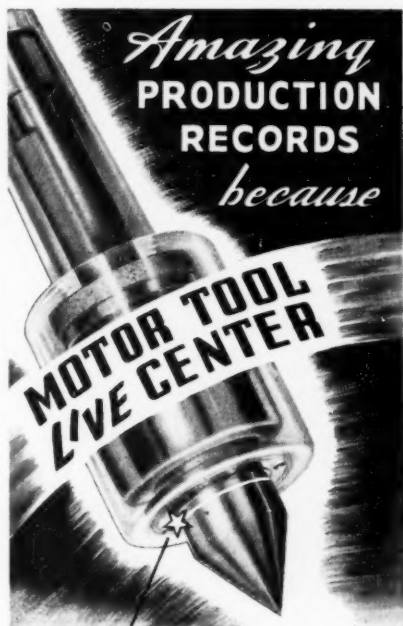
completely automatic. There are two graduated scales, one alongside the vise and one at the saw frame where the feed stop is located. When material is clamped into the vise, a glance will show how many inches of cutting are required. The indicator on the feed stop is then adjusted for this length. The machine will saw to the set length and automatically return to its starting position. The saw can also be operated manually.

The electrically controlled work feed pressure is manually adjustable from zero to 100 lbs. This feed is equipped with an adjustable hydraulic check control.



The saw blade used is 3/4" wide by 162" long. Special guides, a combination of rollers and hard aluminum bronze pieces, provide accurate guiding of the saw blade. The upper guide is adjustable to 18" in height. A 1 h.p. motor is used for the five-speed saw blade drive, a separate 1/3 h.p. for the automatic work feed. Floor space required is 31" x 58", overall height 78". For complete details, write:

Grob Brothers, Dept. BB  
Grafton, Wisconsin



is the **ONLY** Center  
with the  
**OVERLOAD  
INDICATOR**

Look for the **RED BAND**

You no longer have to guess whether you are overloading your live center thrust bearings if you use **MOTOR TOOL LIVE CENTERS**. When the load is too great the **RED BAND** around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the **RED BAND** is visible you are running **COOL** and **SAFE**.

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NEW descriptive folder . . . and verified case histories of how **MOTOR TOOL LIVE CENTERS** have out-performed and outlasted ALL other centers on exceedingly tough, continuous-run jobs.

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8663 DAYTON ST. DETROIT 10, MICH. PHONE BR-5347

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to Call Motor Tool

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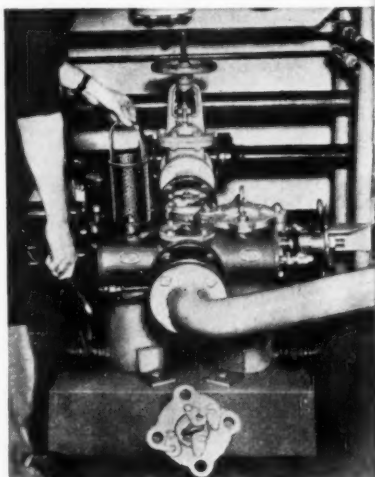
### DISC TYPE DUPLEX STRAINER

A duplex strainer, designed to handle fluids with a high solid content without the necessity of interrupting pipe line operation to clean the strainer, is announced. These units are suitable both for intermittent and continuous flow. Their design permits the handling of sudden surges of solids.

Flow through the unit is diverted from one straining chamber to another by an easily operated handwheel without the possibility of a positive shut-off. While flow passes through one straining chamber, the other may be cleaned. Covers are removable for lifting out the perforated strainer baskets. This strainer is adapted to high open area ratio and is suitable for a wide range of pressures and temperatures.

The strainer basket is set eccentrically, with respect to the basket chamber, so that the flow section is proportional to the flow needs at all points, thus minimizing pressure drop. The unit is available in bronze, steel,

semi-steel and cast iron, with strainer baskets made to specification in perforated brass, monel, or other metals depending upon the service conditions.



Mesh or magnetic types are also furnished to specifications.

For further information, write:  
**J. A. Zurn Manufacturing Co.**  
Dept. Z-5  
Erie, Pa.

### AUTOMATIC CHUCKING AND INDEXING FIXTURE



- 1.—1800 light cuts per hour.
  - 2.—Either horizontal or vertical position.
  - 3.—Collets changed instantly.
  - 4.—Automatically knocks piece out.
- Model D—Ratchet indexing only—1" cap.  
Model E—Both degree and ratchet indexing  
—Capacity up to 1".  
Model F—Both degree and ratchet indexing  
—Capacity up to 2 1/4".

Write for Folders

**J. W. DEARBORN • Ansonia, Conn.**

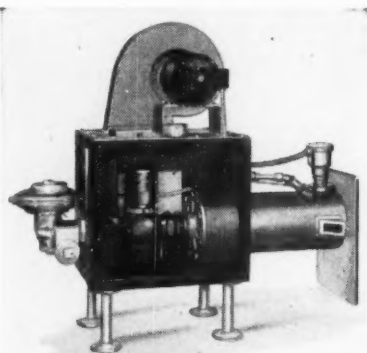
### NEW GAS FIRING UNIT STRESSES SAFETY, ECONOMY

A new complete Gas Combustion Assembly, called the "Gas Pak", for the automatic, economical firing of several types of heating equipment, has recently been introduced by the Eclipse Fuel Engineering Co. It is presented as a complete "package" unit, comprising the blower, burner, mixer, safety equipment, valves, regulator, piping and wiring, all self-contained in the assembly as shipped from the factory.

The unit is entirely automatic, after gas and electric supply have been turned on. To install, it is necessary only to set the unit in place, connect the gas supply and plug in electrical connections.

In addition to installation economy

offered, there is also a saving possible due to the ease of adjustment of the burner air and gas input ratio. Safety is provided by a built-in, electronic type, flame failure unit which closes the main solenoid valve instantly in the event of pilot flame failure.



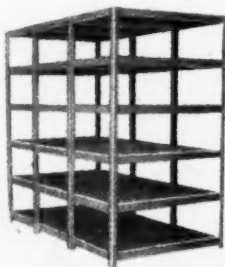
High efficiency is reported, due to the control of the air-gas ratio and B.T.U. input and the use of gas fuel. Quiet operation results from the slow velocity of air draft and the use of a nozzle mixing type burner. The field of application for the Eclipse "Gas Pak", includes the firing of a variety of heating units, such as Steam Boilers and Water Heaters; Heating Plants; Industrial Ovens; Reel-Type Bake Ovens; Air Heaters and similar equipment. Full details and specifications are covered in the Bulletin H-25, available upon request.

**Eclipse Fuel Engineering Co.**  
750 So. Main St., Dept. BB  
Rockford, Ill.

#### **POLLARD TOOL AND DIE RACK**

The Pollard Brothers Manufacturing Co., makers of steel factory equipment, have recently added to their line, a rack for tools and dies. Each shelf of this sturdy equipment will sustain 600 pounds or more. The four upright posts are made of standard steel angles,  $1\frac{1}{2}$ " x  $1\frac{1}{2}$ " x  $\frac{1}{8}$ ". The shelves are made of 16-gauge steel formed down to 2" on all four sides, and pierced for four  $\frac{1}{4}$ "

stove bolts on each corner, thus forming a strong and rigid rack. The lowest shelf is 2" off the floor, with five shelves above it, each with 10" clearance.



Shelves are not adjustable for height, but are on fixed centers. Total height of the rack is 63". Finish is in olive green lacquer. Write for information to:

**Pollard Brothers Mfg. Co.**  
5519 Northwest Highway  
Chicago 30, Ill.

### **OUR EFFICIENT TOOL DESIGNING**

*means  
better production  
at a lower cost*

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools — designed for economy of operation, resulting in your increased production at lower costs.

**COLUMBUS DIE TOOL  
and Machine Co.**

930 CLEVELAND AVE., COLUMBUS 1 OHIO

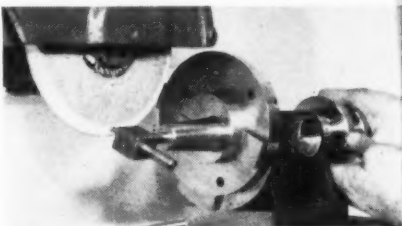
## NEW ANGLE TANGENT TO RADIUS WHEEL DRESSER

A recent development in the field of grinding wheel dressers is a device which is claimed to reduce dressing time 100%. The new unit is called the Last Word Wheel Dresser, a product of the Last Word Sales and Engineering Co. It is a precision tool which stresses, primarily, simplicity of setting. The dresser gives the needed accuracy for angle tangent to radius set-ups, and is adaptable to exacting standards.

One setting of the wheel dresser will give any two required angles, as well as any set radius. The device dresses the wheel at the grinding point of contact. Due to its rugged construction, the dresser is claimed by its manufacturer to be capable of years of service. Upon placing it in position for grinding radius angles, it will be noted that the unit clears the wheel guard, and keeps the hands safe from the danger of contact with the wheel. The dresser requires no measuring pins nor guesswork in determining accurate radius settings.

Instead, Johansson blocks and parallels are utilized to secure precise concave and convex settings.

For complete instructions on the use

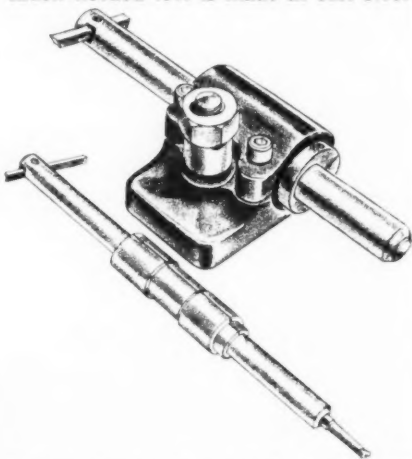


of the Last Word Wheel Dresser, write to the manufacturer for 2-color, illustrated bulletin.

**Last Word Sales and Engineering Co.**  
P. O. Box 287, Dept. BB  
Royal Oak, Mich.

## HEAVY DUTY UNIVERSAL BORING BAR HOLDER

A new type of universal Boring Bar Holder has recently been placed on the market by Tool Specialties Co. This much-needed tool is made in cast steel



in two sizes, to fit any lathe from a 12" to a 26" swing. It is claimed to be especially useful for heavy boring and turning operations due to its solid mounting

## DO IT WITH DIAMONDS

Have you a problem for which no ordinary material offers a solution? Come to the people with diamond know-how.

Our specialty diamond products include cutting and boring tools, single and double end hones, glass cutters, engine turning and engraving tools, precision lapped radius diamonds, ball radius dressers (180°), diamond cone drills in sizes from .080" to 1" for glass, sapphire, ceramics, and other hard material and gage point diamonds.

**DIAMOND TOOL RESEARCH CO.**

305 E. 45th St.  
New York 17, N. Y.

**DTR**  
*Diamond*  
**Tool Research Co.**  
FOREMOST IN DIAMOND TECHNOLOGY



on the tool-post without any overhang.

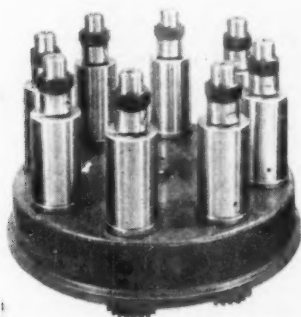
By turning the eccentric master sleeve, bars with bits are instantly adjusted level to and accurately with the lathe spindle, and are then clamped tight through the split bushing and housing. The solid foundation of the holder prevents vibration. The bar ends are broached for both square and angular setting of the tool bit.

The specifications for the 14" bar, which fits lathes from 12" to 16" swing, include a minimum and maximum bar diameter of  $\frac{3}{4}$ "-1"; the minimum and maximum distance from the base to the center of the bar is  $1\frac{1}{8}$ " and  $1\frac{3}{4}$ "; the tool-bit opening is  $\frac{5}{16}$ " and  $\frac{3}{8}$ " square. Specifications on the 16" bar, for lathes from 18" to 26" swing, are proportionately larger. Standard equipment with this unit includes the boring bar holder, two bars, one 14" and one 16", with one sleeve, and a T-bolt with hex nut for mounting the device on the lathe tool-post. For complete specifications on this useful set-up device, write the manufacturer:

**Tool Specialties Co., Dept. BB**  
**Raymond Commerce Bldg.**  
**Newark 2, N. J.**

#### **AUTOMATIC, SPRING-ACTUATED COLLET CHUCK**

Another new application of the Erickson Collet Chuck is the spring-actuated,



cam released set-up, illustrated, which speeds up polishing, grinding and similar machining operations. The operator

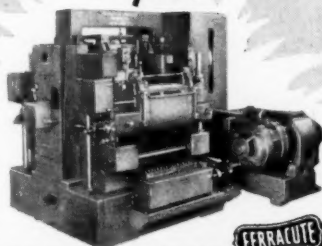
merely feeds and unloads the machine. Eight Erickson Collet Chucks are mounted on a multiple-spindle head. Chucking and release of parts is fully automatic. A cam releases spring tension on each chuck as it comes into unload and feed positions. The Erickson double-angle principle insures instant expansion of the collets, allowing easy removal and loading of work.

The cam then releases the actuating-spring which collapses the collet on to the piece. Positive collapse brings the entire surface of the collet into contact with the stock. Run out and slip-page is eliminated. Finishes are not marred or scratched by the collets. For further details, write:

**Erickson Tools Division, Dept. BB**  
**2311 Hamilton Ave.**  
**Cleveland 14, Ohio**

**John N. Brickman**, formerly field engineer for Norton Company, Worcester, Mass., has been appointed abrasive engineer in an additional territory recently created in the city of Chicago.

*800 strokes  
per minute*



#### **FERRACUTE SUPER SPEED PRESS**

Revolutionary SPEED! Revolutionary principle! Die bed reciprocates in a horizontal plane and punch member takes motion direct from crank shaft. Takes standard die sets, reduces wear. Write for full details.

**FERRACUTE MACHINE COMPANY**

Super Speed Press Division  
Bridgeton, New Jersey

Power Presses Press Brakes Special Machinery



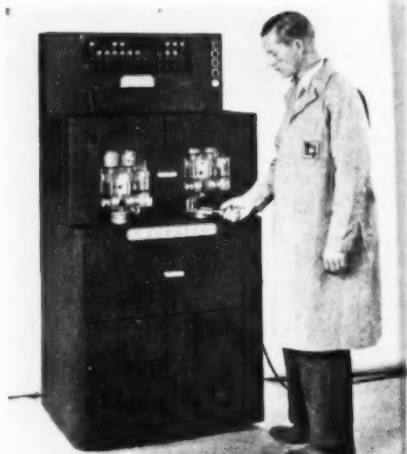
## SHEFFIELD AUTOMATIC AIRLECTRIC MACHINE

An unusual automatic Airlectric gaging and classifying machine for refrigerating unit muffle boxes has been developed by The Sheffield Corporation. Two identical mechanisms for gaging, classifying, and stamping are incorporated in the machine, one spindle being unloaded and loaded by the operator while the other mechanism is going through the gaging cycle. The maximum rate of operation permits the checking of 1500 parts per hour.

The operator manually places the part in gaging position, which automatically starts the cycle. A clamping device descends and locates the muffle box for gaging. The average diameter of the counterbore is checked with a multiple-orifice solid tungsten carbide spindle connected with a series of Airlectric gaging heads, and its classification, one of three of .0003" tolerance each, is retained by a "memory" device. At the same time the depth of

the counterbore is checked and its classification set up, one of seven of .0003" each.

The final classification, one of 21 of .0003" each, is then automatically stamped on the muffle box by means of air operated metal die stamping mechanisms.



Should the muffle box bore be beyond tolerance limits, lights indicate which dimension is out of tolerance, and the stamping device is not actuated. The machine will not cycle if a part or a master is not in gaging position.

This machine supplements another Sheffield automatic Airlectric machine which gages the lapped valve plates that form a part of the muffle box assemblies. The valve plates are gaged, classified and segregated into 27 classifications, including combinations of under-size and oversize. The machines are used together in making selective fits of the two components. For descriptive information, write:

**The Sheffield Corp., Dept. BB**  
Dayton 1, Ohio

## HAND SPRING WINDER

**NO  
LATHE  
NECESSARY**



1. Ideal for tool room & maintenance shop
2. Easily operated by hand
3. No lathe necessary
4. Mandrel capacity to 1 1/2"
5. Wire capacity up to .229" diameter
6. Pitch capacity up to 1"
7. Clamps in your bench vise

4 SIZES  
Priced from  
**\$15 to \$35**  
DELIVERY ONE  
WEEK

Write for Complete Catalog

## MONTGOMERY

Machine Tool Accessories

53 PARK PLACE

NEW YORK CITY

## SUN OIL DEVELOPS NEW HYDRAULIC LUBRICANT

A new dual-purpose oil is being introduced by Sun Oil Company for use in hydraulically operated machine tools

its  
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ally  
s of  
ing

that pressure-feed way lubricant from the hydraulic system. This new lubricant, named "Lubeway," has been subjected to more than a year's exhaustive testing in machine tool builders' laboratories and under regular production conditions in industry.

It had been found that ordinary hydraulic oils did not perform properly as way lubricants because they did not possess adequate film strength or metal-wetting qualities. This deficiency caused chattering of the table, excessive wear on the ways, and made close tolerances and fine finishes impossible.

Lubeway was found to have all the stability and non-sludging characteristics of a good hydraulic oil, and also to possess the metal-wetting and extreme-pressure qualities of a good way lubricant.

Tests showed that Lubeway did not form any gummy deposits in the pumps, lines, valves, or controls. It further proved its ability to protect ways and slides and assure their smooth operation.

Available in two viscosities, Lubeway 150 and Lubeway 300, are recommended for hydraulically operated machine tools—such as milling machines, grinders, and boring machines—that pressure-feed way lubricant from their hydraulic systems. For complete information, write:

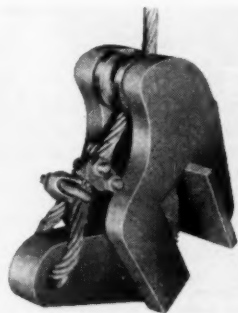
Sun Oil Co., Dept. BB  
1608 Walnut St.  
Philadelphia 3, Pa.

#### NEW MARBO-CLAMP FOR HANDLING STEEL PLATE

A new steel plate clamp for handling all plates from  $\frac{1}{4}$  to 2" is introduced by The Marbott Weld Company. Named the "Marbo-Clamp", it operates on the principle that the heavier the plate, the greater the leverage, therefore, the tighter the grip. Plates cannot slip from the jaw of a "Marbo-Clamp" and danger to employees and equipment is eliminated.

The "Marbo-Clamp" measures 9" wide by 12" high; it is of flame cut and

welded construction of tough, flexible, alloy steel. Gripping teeth are hardened to prevent tooth breakage or chipping. Unit includes wire rope complete, ready



to attach to hoist or crane. Write the manufacturer for full details.

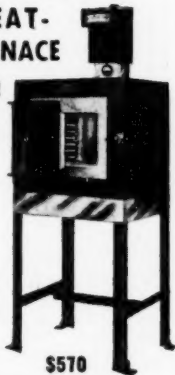
Marbott Weld Co., Dept BB  
4389 Martin Ave.  
Cleveland, Ohio

## LUCIFER...

### ELECTRIC HEAT- TREATING FURNACE

#### MODEL—DL 7052

Set the dial . . . throw the switch, that's all! The furnace climbs to predetermined temperature. Climbs to 1600° F in 40 minutes . . . 2000° F in 72 minutes. Contains over 1725 cubic inches of muffle. Complete with Lucifer 100% automatic electronic control. Muffle size is 12" wide, 12" high, 12" deep.

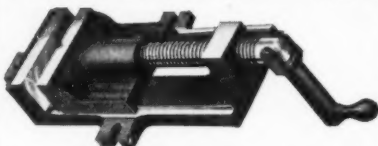


\$570

**SATISFACTION GUARANTEED**  
Some territories open for distributors.

**GILBERT S. SIMONSKI**  
401 N. Broad St., Philadelphia 8, Penna.

## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

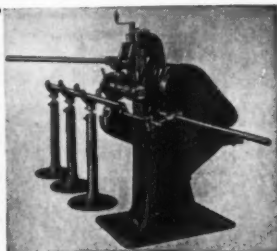
| Vise No. | Width of Jaw, inches | Opens inches | Weight Pounds |
|----------|----------------------|--------------|---------------|
| 1D       | 3½                   | 3¼           | 12¼           |
| 2D       | 5                    | 5½           | 23            |

Do you need a vise of ANY type?

*Write today for bulletins on the extensive Yost line*

**YOST MFG. COMPANY**

1335 SO. MAIN STREET  
MEADVILLE, PENNSYLVANIA



## Faster TUBE & PIPE CUTTING

Steen High-Speed pipe, tube and column cut-off machines embody unique design and rigid construction features to greatly step up cut-off operations. Available in three sizes to cut diameters ¼" to 3"; ½" to 6"; 3" to 12".

WRITE FOR CIRCULAR TODAY

**Continental Machine Co.**  
1954 Maud Ave. Chicago 14, Ill.

## THOR IMPACT WRENCH PERFORMS MULTIPLE OPERATIONS

A new Thor ¾" Universal Electric Impact Wrench is announced by Independent Pneumatic Tool Co., manufacturers of Thor portable power tools. The new wrench is a rugged, well-balanced light weight tool, weighing slightly over six pounds. Its impact mechanism features include positive drive, high torque, negligible torque reaction, smooth operation, low maintenance, and long life.

Trademarked "Packy," this tool's applications include driving nuts, bolts, cap screws up to ¾" thread size, driving studs up to ½" thread size, removing broken studs (using Ezy-out extractor), driving and removing machine screws to ¾" thread size, wood screws up to No. 20, drilling holes in steel to ¼", step drilling or reaming holes from ¼" to ½" in ⅛" steps. It accomplishes tapping up to ½" thread size, driving hole saw up to 1½" diameter through metal, driving rotary files, driving burring tools, and many other uses. Limited only by the ingenuity of the operator.



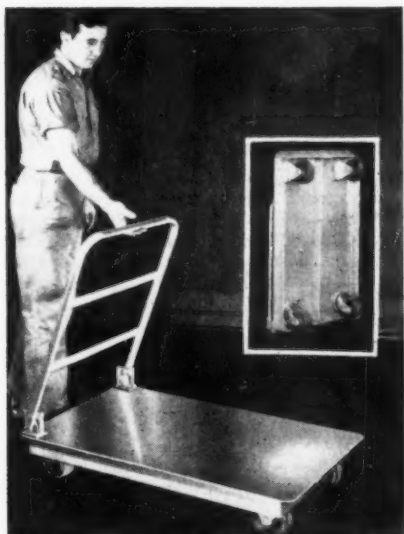
The new Thor wrench has a highly polished die casting case, a free speed, forward or reverse, of 2150 r.p.m.; it strikes 2000 blows per minute, operates on a.c.-d.c.-60 cycles. For complete information, write for circular No. 1025 to:

Independent Pneumatic Tool Co.  
175 State St., Dept. BB  
Aurora, Ill.

## COLLAPSIBLE ALUMINUM UTILITY TRUCK

The Wesley Aluminum "Fold-A-Truc" has recently been announced by the Waprin Corporation. This is a collapsible, aluminum platform utility truck which weighs only 60 lbs., yet has the unusual load rating for its weight, of 1200 lbs.

An outstanding feature is the collapsible handle which folds against the platform when the truck is not in use, permitting it to be set on end and stored in a space only 10" deep. With the truck so easy to fold and store when not in use, there is less chance of its becoming a safety hazard by being left in aisles where employees might trip over it.



The truck is riveted throughout. Its 24" x 40" heavy aluminum plate platform is reinforced with a heavy aluminum angle running the length of the platform. The truck is equipped with two swivel and two rigid 5" double ball bearing casters for easy maneuverability. For further information, write:

The Waprin Corp., Dept. BB  
501 S. Jefferson St.  
Chicago 7, Ill.

# famco machines

COST  
CUTTING

## ARBOR PRESSES



Famco arbor presses are available in 32 stock models for floor or bench mounting . . . feature exclusive adjustable gib for front and side ram adjustment. Average less than 2c a year per press for maintenance cost!



## FOOT PRESSES

Savings multiply on light punching and forming jobs with the use of any one of the 10 Famco foot press models. They may be bench or floor mounted.

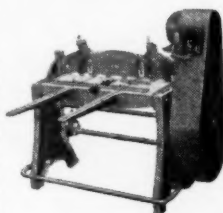


## POWER PRESSES

These power operated, open-back, inclinable power presses are available in bench or floor models. Have semi-steel cast iron frames; solid, forged, precision-ground crank-shafts. With or without motor.

## POWER AND FOOT SQUARING SHEARS

These extremely low-cost shears cut up to 18 gauge mild steel. Cutting widths 22" to 52". Precision ground inlaid tool steel blades; cast semi-steel frame. Power Shear easily set for non-repeat or continuous operation.



Famco Machines save in first cost, operating cost and maintenance cost. Write today for full details about the complete line . . . there is no obligation.

## FAMCO MACHINE CO.

1320 18TH STREET • RACINE, WISCONSIN

### BALL-MATIC COLLET CLOSER AND STOCK FEEDING ATTACHMENT

An outstanding new Collet Closer and Stock Feeding Attachment has been placed on the market by the N. C. Nichols Machine & Engineering Corp. This comparatively simple, self-contained device can be used to convert an ordinary lathe or hand screw machine into a semi-automatic type machine. Models are available in  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", and 1" sizes.

The new device, called the Ball-Matic, feeds any shape stock to the full collet capacity by a simple alignment of the feed tube to the collet. The unit feeds the stock automatically in lengths as short as tenths. It speeds production by eliminating stopping of the lathe and hand-feeding of stock.

The positive, quick-acting collet closer requires no closing fingers, cams, or expensive tooling. There is no push back of stock, regardless of the cut.

The Ball-Matic is stated to operate at increased spindle speeds up to 500 r.p.m., thus effecting considerable savings in man hours.



For complete structural information write:

**N. C. Nichols Machine & Engr'g. Corp**  
1 Sylvan St., Dept. BB  
Peabody, Mass.

### NEW GISHOLT PLASTIC CHUCK JAWS

The common lathe practice of holding work in soft steel jaws is not always satisfactory, since when holding on a machined surface, the pressure will occasionally mar the work. When holding tubing or other thin-wall parts, there is the danger of distortion. The Gisholt Machine Company was faced with this problem in their own machine shop. After considerable experimentation with various materials, they developed a new lightweight Plastic Soft Jaw Blank.

This jaw is molded, phenolic type of plastic. It can be machined to size

with the same feeds and speeds as used for brass. The jaw has from two to two and one-half times the gripping power of soft steel under the same chucking pressure. It can be used for either first or second operation work. It is recommended for cast iron, aluminum, brass or any other material that does not require coolant during machining. These Plastic Soft Jaw Blanks have now been made available to every user of Gisholt chucks. For complete information, write:

**Gisholt Machine Co., Dept. A-M**  
Madison 10, Wis.



*Air-Way Valve*  
The Valve with the  
Internal Fulcrum Lever

An ingenious  
inside lever ar-  
rangement opens  
valve. Quick acting. Self  
closing.

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**AIR-WAY PUMP & EQUIPMENT CO.**  
1054 N. Kilbourn Ave., Chicago 51, Ill.

## GEM VISES



**J. E. MARTIN MACHINE WORKS**  
**SPRINGFIELD, OHIO**

## JOYCE BALL TRANSFER TYPE SUPPORT STAND

The Joyce Manufacturing Co., Cincinnati builders of machine tool products, announce their new Ball Transfer Type Support Stand. It may be



used to support semi-rigid and rigid sheet material as it is being machined. This stand has been designed primarily for use with heavy gauge Shears and Press Brakes.

The ball transfer consists of a large hardened steel ball resting in a cradle of smaller ball bearings. This allows sheets to roll horizontally in any direction or to be pivoted.

These Support Stands are available in three different height overall sizes: Type B1—36 to 54 inches; Type B2—36 to 48 inches; and Type B3—24 to 36 inches. The 1½" diameter adjusting screw allows 12 or 18 inches of adjustment depending upon the overall height of the support stand.

The base is 18" in diameter and weighs more than all the other parts of the stand put together. This provides a substantial support difficult to tilt, and easy to adjust or locate wherever required. The unit is sturdy and is capable of absorbing rough treatment. For additional data, write:

**Joyce Manufacturing Co., Dept. BB**  
3321 Dickinson Road  
Cincinnati 11, Ohio.

## BUFFALO PNEUMATIC CHIP GUN

**A NEW METHOD OF REMOVING CHIPS FROM BLIND DRILLED AND TAPPED HOLES.**

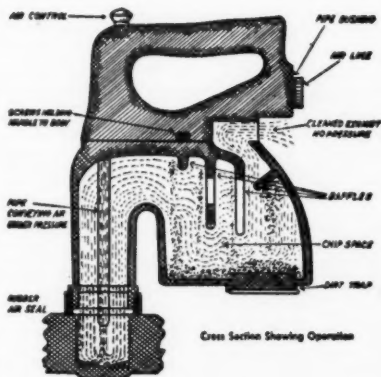
**SAFE! CLEAN! EFFICIENT!**

Eliminate the danger to your workmen from flying chips by removing your cuttings with the BUFFALO PNEUMATIC CHIP GUN. Simply place the nozzle over the hole, release the air by thumb pressure and the cuttings are deposited in the body of the gun.

Available in two sizes:

Model A—For ¼" to ⅝" dia. holes

Model B—For ½" to 1½" dia. holes



Write for Bulletin No. 1011 today

**BUFFALO MACHINERY CO., INC.**  
838 Grant Street  
Buffalo 13, New York



### DIE CASTING MACHINE HANDLES ADDITIONAL METALS

The Model M55A/HF, DCMT's latest and smallest high speed Die Casting Machine has been modified to handle all standard zinc alloys as well as lead and tin based metals.

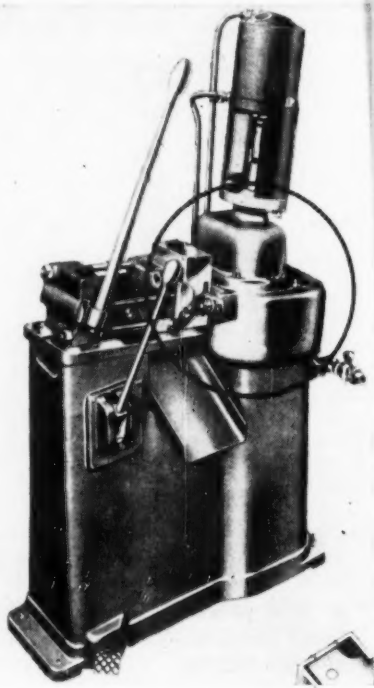
The versatility of this new DCMT Pressure Die Casting Machine is made possible by a hydro-action nitra-alloy lined pot (circled in the illustration) which uses hydraulic suction to fill the cylinder. There is a porthole at the base which permits all the metal in the pot to be used before refilling becomes necessary.

The DCMT Model M55A/HF is a small air operated unit utilizing low-cost, single cavity dies operating at high speed. It brings pressure die casting within the range of manufacturers who have heretofore been unable to use this process, owing to the cost of multi-impression dies. The machine can maintain a production rate of 20,000 "shots" per week, yet is simple and light. According to DCMT Sales Corp., it produces smooth, clean, relatively "flash-free" castings and eliminates most secondary operations, leaving only tumbling and finishing to complete the product.

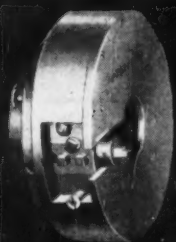
Other features include optional hand and foot controls and a new air system with integral pilot and ram valves. Toggle links are forged clevis hardened steel. The machine carriage is undercut for downpulls and ejecting large castings. The base plate is adjustable to allow the use of die blocks of any required thickness.

The DCMT Sales Corp., offers en-

gineering advice without obligation. Products and parts sent to them are analyzed as to their adaptability to



pressure casting on the DCMT unit.  
DCMT Sales Corp., Dept. BB  
315 Broadway  
New York 7, N. Y.



### IMPROVE FACING OPERATIONS

M-D Facing Head feeds automatically. Lathe tool bit travels radially, from center outward or reverse. 10 sizes 6" to 46" dia. Write for Bulletin, Prices.

On Boring  
Mills  
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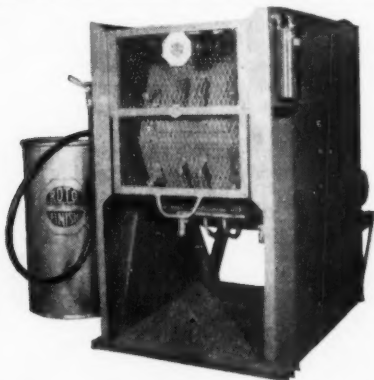
MUMMERT-DIXON COMPANY, HANOVER, PA.



tion.  
are  
to

## 8 DOOR ROTO-FINISH MACHINE

A new 8 door machine for finishing parts whose size and shape are not adapted to standard Roto-Finish pro-

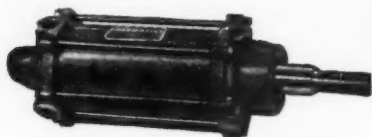


cessing methods is announced by The Sturgis Products Co. Built as special equipment for individual requirements, the new 8 door machine is similar to the standard single compartment Roto-Finish machine, except that each flat surface of the octagon cylinder is fitted with a large size door. Parts are rigidly fixtured to the back of each door, so that surfaces to be finished are presented to the processing mass. Selective action caused by one-direction processing is overcome by reversing cylinder rotation.

Extra cam locks are fitted to each door to overcome added strain imposed by fixtures on the doors. Doors and fixture plates are interchangeable to handle several different parts, all of which may be processed at one time. Doors may be obtained unlined or rubber lined. Due to variety of requirements, the motor size varies with each application. Automatic timer controls are optional. For detailed information, write:

The Sturgis Products Co., Dept BB  
Sturgis, Michigan

1 WEEK DELIVERY ON  
THESE STANDARD CYLINDERS



Series "E" Model 1400-E Pivot Mount

These cylinders are made to your order with any length stroke you request in any of these bore sizes:

1½, 2, 2½, 3, 4, 5, 6, 8, 10

In ordering please write mounting, bore, stroke and piston rod thread you want.



Series "E" Model 1500  
Foot Mount



Series "E" Model 1200 Front  
Flange Mount



Series "E"  
Model 1300  
Rear Flange  
Mount

Cylinders—any  
bore, any stroke,  
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air, water,  
hydraulic

**PNEUMATICS INCORPORATED**  
OF PLYMOUTH INDIANA

**DON'T WAIT UNTIL TAPS  
BREAK OFF — and then  
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**WALTON**  
Tap Extractors**

Remove  
Broken Taps  
Quickly and  
Easily.

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No. 12 and full  
details of 30 DAY  
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**The WALTON Company**  
Hartford 10, Connecticut



# WHO

## MAKES QUALITY SCREW MACHINE PRODUCTS

It's no question . . .  
it's a fact!

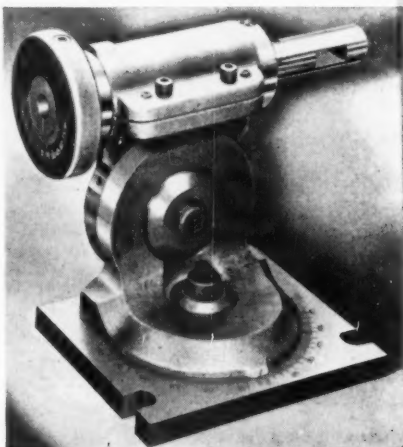
When you need cap screws, set  
screws, milled studs or coupling  
bolts of any machineable material  
and with *any* thread, remember . . .  
**WHO** makes them better.

**WHO is... Wm. H. Ottemiller Co.**  
YORK, PENNA.

Write for name of nearest distributor and our free illustrated folder.

**MADISON ANNOUNCES NEW GRINDING  
FIXTURE**

A new cutter grinding fixture is announced by the Madison Manufacturing Co. Originally designed to facilitate the regrounding of Madison cutters, the device has been modified to accommodate a variety of grinding jobs. The manufacturer states that it has been used successfully to grind cutting edges, steps, flutes and chip relief on Madison roughing and reaming cutters, milling cutters, chamfering tools, turning tools and reamers.



The Madison Grinding Fixture is graduated in degrees in all three planes. It offers automatic indexing for Madison tools, and any other where 180° indexing is required. This automatic index feature can be released for conventional handling of other types of tools. The simple construction eliminates complex vernier calibrations.

Arbors for all sizes of Madison cutters (both roughing and reaming), for single point tools, and for milling cutters are available. Special arbors may be obtained if needed. For complete specifications on this useful device, write:

**Madison Manufacturing Co.**  
Dept. BB  
Muskegon, Mich.

## NEWLY DESIGNED HAND SHEARS

Incorporating the best features of the standard line of Jacques Shears, the Hobbs Manufacturing Co. of Worcester, Mass., who purchased the Jacques Company three years ago, has recently announced a newly designed hand shear called the "Jacques Universal Shear".

Featuring four medium size models up to 50" with a welded steel base, and two heavy duty models in 55" and 60" sizes with a heavily reinforced flame-cut base, the new shear is stated by the manufacturer to do rapid, accurate hand cutting of paper, rubber, mica, asbestos, light metal and other materials.

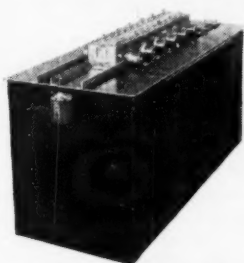


The balanced steel blade, with high carbon steel edge, the light foot action clamp and easy set gauges are among the shear's advantages. A dovetail lock on the table gauge assures precise alignment, while still allowing angular adjustment for angle cutting. The kiln-dried 36" birch table is set on a heavy cast base. The clamp is adjustable for thickness of work and a worm gear arrangement adjusts drop bed and back gauge. A simple spring gauge handles small cuts efficiently.

For further information and literature write:

**Hobbs Manufacturing Co., Dept. 240  
Worcester 5, Mass.**

## ROLL FORMING MACHINES AND ROLLER DIES



Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

Your inquiries invited.

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2634 Fullerton Ave. Chicago, Illinois



## Universal Stock Reel

The Humm Universal Stock Reel is an essential device for the handling and feeding of coil stock to Power Presses.

1. Adjustable Reel to fit various sizes of coil.
2. Reel is adjustable to suit height of Press.
3. Reel can be inclined to any position.

Stock Reel with plain bearing \$35.00

Stock Reel with roller bearing \$65.00

Manufactured By

**John Humm Safety Equipment Co.**  
253 SHEFFIELD AVE., BROOKLYN 7, N. Y.

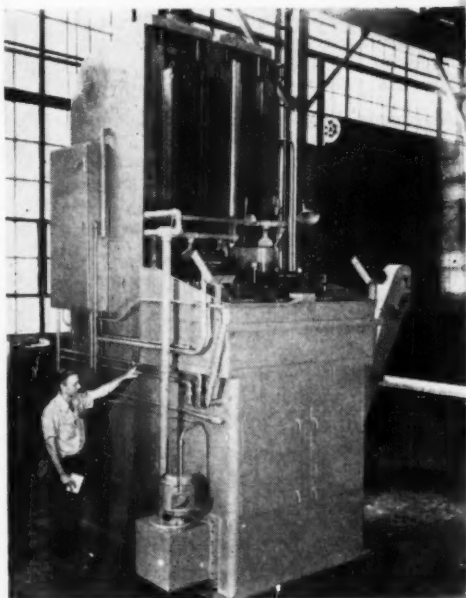
## HUGE DUPLEX SURFACE BROACHING MACHINE FEATURES AUTOMATIC TABLE CYCLE

American Broach and Machine Company, Division of Sundstrand Machine Tool Co., has recently completed the manufacture of what is believed to be the largest duplex surface broaching machine ever built. This massive unit, which broaches the large diesel bearing supports, is over 15 feet in height and weighs in excess of 34 tons.

The outstanding feature of the tooling design of this ponderous machine is the automatic cycle of the left hand table and the right hand broach arbor, both of which index six times in generating one complete broaching cycle. The left hand station surface broaches the step joint faces in the six passes, and the right hand station rough broaches the half round surface in six passes.

The part which is broached weighs over 150 pounds; approximately  $\frac{1}{2}$ " of stock is removed on approximately 110 square inches of surface.

The 72" stroke, 40-ton capacity machine is equipped with the interlocked electrical controls and provides continuous machine cycle during the six passes necessary to complete one part. A chip conveyor was provided to handle the excess amount of chips accumulated in broaching a part of this size. The production of this particular part has been increased twenty times through the adaption of



broaching over that obtained by the previous machining method.

For complete dimensions, specifications and operational data on this Duplex Surface Broaching Machine, write: American Broach & Machine Co.

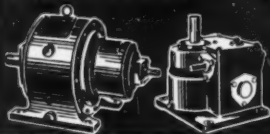
Dept. BB  
Ann Arbor, Mich.

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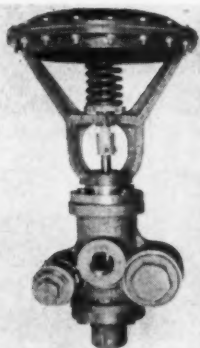
couple such engineering with long experience, and every modern facility. This explains their records! Spur, worm and combinations, 1/50 to 417 h.p. Ask for complete catalog.

**Abart GEAR & MACHINE CO.**

4832 W. 16th St.,  
Chicago 50, Illinois

### MERIT VALVES DESIGNED FOR HIGH-PRESSURE SERVICE

A complete line of diaphragm-actuated two-pressure valves is now available for a wide range of application in high pressure hydraulic service, it has been announced by Emmett Machine and Manufacturing, Inc. The new Merit valves range in size from 1 to 4 inches, and they can be furnished for operation on systems having 3000, 5000, and 10,000-pound p.s.i. pressures.



All valves have capacities equal to or exceeding standard pipe areas. Variations of valve assembly provide for (1) diaphragm-controlled high-pressure inlet, (2) diaphragm-controlled slow-travel valve, or (3) diaphragm-controlled stop valve, all within one casting and with minimum pipe connections.

Merit valves feature the interchangeability of seats and discs between main valve and check valve assembly.

The use of heat-treated Monel seats and discs in a bronze valve body assures maximum valve life and a minimum of maintenance, and virtually eliminates electrolysis. Seat rings can be reversed, and the need for gaskets as pressure seals on cap ends is avoided. The valves can be used for either oil or water hydraulic service. For complete specifications, write:

**Emmett Machine & Mfg., Inc.**  
2249-7 Fourteenth St., S.W.  
Akron 14, Ohio

### FOR EXTREME ACCURACY AND FASTER PRODUCTION



## Use the New **BLACK** Drilling Unit

● Black Drilling Units, designed to operate in any position, employ an entirely new principle. A patented traversing motor shaft is the work spindle. Because spindle and motor rotor are integral, torque is applied evenly around the spindle. Air feed provides rapid shockless advance to the work. Hydraulic control from this point provides uniform drill feed, even when breaking through. Oversized bearings insure long life. Jacobs chucks are standard, but No. 2 female Morse taper can also be supplied.

Micrometer stop insures depth accuracy to .001". Calibrated stop control makes adjustment easy. Interlocking and auxiliary controls are easily installed.

Sizes from ¼ to 1 HP have the same base-to-center-of spindle dimension for interchangeability. Speeds from 840 to 3450. Voltages 209 to 550, 3 ph., 60 cycles. Sizes to 10 HP can also be supplied. Units are adaptable to any operation requiring a combination of rotating and traversing motions.

*Write for detailed information.*

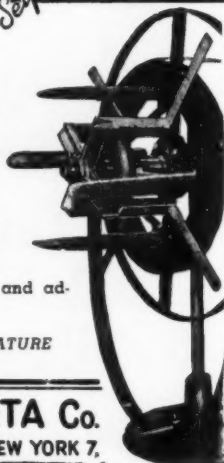
**BLACK DRILL CO.,** Division Black Industries

**1374 East 222nd St. • Cleveland 17, Ohio**

# WESTLEN REELS

*Adjustable  
Self Centering*

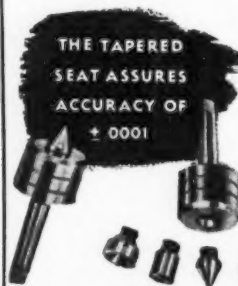
For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.



SEND FOR LITERATURE

**The RULETA Co.**  
27 WARREN ST. NEW YORK 7,

*Empire*  
**LIVE CENTERS**  
• ACCURATE • VERSATILE  
• HEAVY DUTY



Manufactured in all tapers. 1 to 6 MT in stock. Special shanks and points made to order. PAT. PEND.

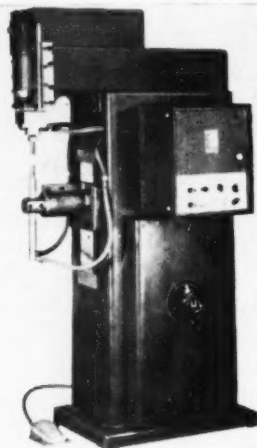
Points illustrated are standard

Write for Literature

**ROYAL PRODUCTS**  
90 UNION ST., MINEOLA, N. Y.

## UNIVERSAL PRESS TYPE WELDER

A new model heavy-duty, press type projection and spot welder in capacities of 50, 75, 100, 150 and 200 KVA has been announced by Universal Welder Corporation. These are air operated welders equipped with a variety of cylinder styles and sizes, suited to different classes of welding and metals. It is claimed that the Universal transformer construction is unusually efficient and durable, utilizing not only asbestos insulation but also an impregnating varnish of the modified silicone type capable of withstanding temperatures of 400° F. and over without deterioration, though the units are designed as though for normal 100° Centigrade (212° F.) operation.



The Universal press head with adjustable gibs has the cylinder built as an integral part of, and moving with the sliding head — the piston remaining fixed. Type "O" ring packing and sealing is used with cylinders operating with metal to metal fits, as generally used in internal combustion engines. For complete descriptive information, write:

**Universal Welder Corp., Dept. BB**  
739 Carnegie Ave.  
Cleveland 15, Ohio



# CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries.

**BLOOMFIELD TOOL CORP.**

36 Farrand St. Bloomfield, N. J.

The Very Best  
Facilities For . . .

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IN SMALL LOTS  
**DAYTON ROGERS**

*Manufacturing Company*

Minneapolis 7, Minn.

## NEW! INDEXING FIXTURE



Here is a new G & H fixture which can be used horizontally or vertically . . . speeds precision machining. 2, 3, 4, 6, 8, 12 and 24 indexes set on

one index plate. Capacity 0 to 1/2". Write for full details.

**G & H MFG. CO.**

327 ELM STREET, FITCHBURG, MASS.

## CARROLL DIVIDING HEADS

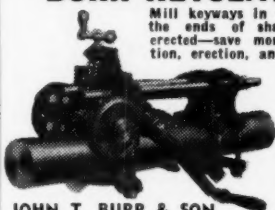


Catalog  
on  
Request

3 SIZES - 4 MODELS - 6" to 12"  
**TROYKE MFG. CO.**

4422 APPLETON ST. CINCINNATI 9, O.

## BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

**JOHN T. BURR & SON**  
429 Kent Ave.,

Brooklyn, N. Y.



## New NESTING TYPE TOTE PANS

20" Long x 12"  
Wide x 6 1/4" Deep  
16 Ga., drag holes,  
handles both ends.

**J. L. LUCAS & SON, INC.**  
BRIDGEPORT 5, CONN.

## Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

Write for Circular  
**NIELSEN TOOL & DIE COMPANY**  
1962 W. Eleven Mile Road,  
Berkley, Mich.



## REICH 3-WAY PRECISION TEST INDICATOR

Lifetime conical bearings, stainless and non-magnetic. Sturdy construction. Needs no service or adjustment. .014" reading.

Price \$6.50

Write for folder

**J. R. Reich Manufacturing Co.**  
45 E. Stroop Rd., Dayton 9, Ohio



### EASY-TO-INSTALL JOINT FOR LINED PIPE

A new pipe joint that greatly reduces the cost of installing and repairing rubber-lined pipe is announced by the Gates Engineering Co.

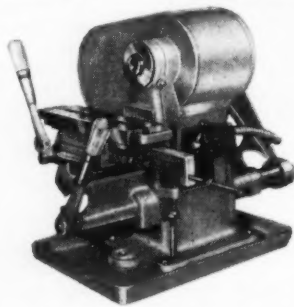
Called the Gaco Joint, the new device eliminates the necessity of detailed layout plans, since lined pipe may be bought in sections, cut and installed on the job. Welded fittings are also eliminated; the pipe is cut, grooved, bored and counterbored with special machine (or regular pipe machine equipped with adapter), rubber inserts are slipped into place, flanges are bolted together and joints are complete in two minutes. By keeping a supply of joints in stock, repairs can be made on the spot by plant maintenance crews.

Gaco Joints are available in  $\frac{1}{2}$ " to 4" pipe sizes as 45° ells, 90° ells, Y's, T's and separate flange kits for connecting straight lengths. Kit for adapting user's pipe machine is available, while special machine may be bought or leased. Write:

Gates Engineering Co., Dept. BB  
New Castle, Delaware

**THIS BURKE  
BENCH MILLER**  
COSTS only

**\$240**  
(less motor)



It's the little Miller with the big reputation for accurate work. For production, tool rooms, schools, hobbyists. Send for catalogue of hand and power feed models.

**The BURKE MACHINE TOOL CO.**

A Division of U. S. Burke Machine Tool Co.  
20 East 72nd St. Cincinnati 16, Ohio

### HAMMOND BELT GRINDER HAS WIDE OPERATING RANGE

Hammond Machinery Builders announce a new addition to their line of Abrasive Belt Grinding and Polishing Equipment. The Model V-2WP, illustrated, is a Wet-N-Dri Flexible Belt Grinder and is especially suited for the wet deburring and finishing of plastics. It offers the advantages of free belt, contour or platen finishing and takes an abrasive belt up to 2½" wide. This machine is not limited to plastics, since it is suited for deburring, grinding, polishing, shaping, chamfering, squaring, etc., on ceramics, wood, rubber, glass, bone, ferrous and non-ferrous metals.



The new Belt Grinder is shown with self-contained tank and pump unit. This same machine is available for connection to water main or can be used dry by shutting off the coolant supply. Descriptive literature is available upon request. Write:

Hammond Machinery Builders, Inc.  
1614 Douglas Ave., Dept. GP-16  
Kalamazoo 54, Mich.

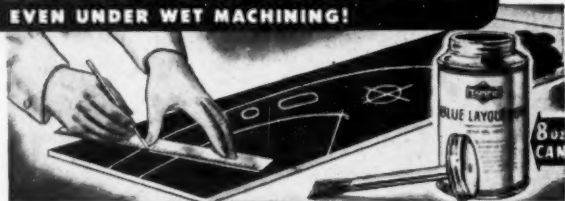
MACHINISTS—TOOL AND DIE MEN—SHEET METAL WORKERS—ETC.

## FREE SAMPLE BLUE LAYOUT DOPE

STAYS PUT EVEN UNDER WET MACHINING!

Speeds layout on all metals. Dries fast. Oil resistant. Won't chip, crack or flake off. Comes in handy 8 oz. brush-in cans, pts., qts., drums. Order now!

**TAMMS SILICA COMPANY**  
228 N. LaSalle St., Chicago 1, Ill.



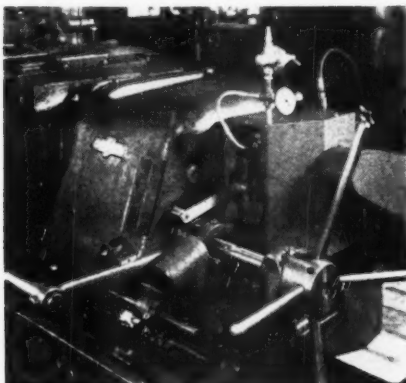
### AUTO-FEED ATTACHMENT FOR CENTERLESS GRINDER

The Bennett Equipment Company, offers the new Auto-Feed attachment, designed for use on a No. 2 Cincinnati

either automatically or manually with a change-over time of less than two minutes. The Auto-Feed can be installed quickly, is claimed to be fool proof in its operation, and has increased production up to 300% in actual usage.

The illustration shows the simple method by which the automatic yoke is attached to the worm wheel, allowing the hand infeed lever to remain on the grinder. The changeover from manual to automatic operation is accomplished by tightening the pinch bolt on the Auto-Feed yoke and loosening the pinch bolt on the hand infeed lever. The drive arm is actuated by two reciprocating cams for positive accuracy and uniformity of feed. The air operated ram ejects the work at the finish of each grinding operation. The Auto-Feed is made to handle any tapered or shoulder work. For complete specifications, write:

**The Bennett Equipment Co., Dept. BB**  
4725 Ellery Ave.,  
Detroit 7, Mich

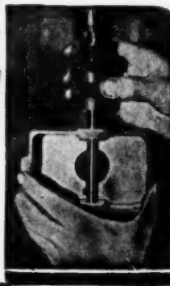


centerless grinder. This ingenious device permits the grinder to be operated

### How to remove burrs - **FASTER, EASIER, BETTER!**

With the new NOBUR tool you can burr holes faster—improve the finish of deburred parts and lower production costs by eliminating burring as a bench operation. The NOBUR tool works like a drill, making burring a fast, easy machine operation. The NOBUR tool is available in 1/16" progressive sizes from 3/16" to 1" in diameter. Write today for new complete burring folder.

**NOBUR MANUFACTURING COMPANY**  
717 North Victory Blvd., Burbank, California



When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

267

## TENITE-TIPPED HAMMER ELIMINATES MOST OF RECOIL

Between the smooth Tentite tips of the new "Tahlen" non-marring, non-recoil hammer is a hollow metal head which contains a charge of steel grit.



As the tip is lowered, the charge follows it, practically eliminating the hammer's recoil, after it has struck. This reduces shock to the wrist and arm, and, according to the manufacturer, results in approximately 30% harder blows. The plastic tips cannot mar harder materials during hammering.

The "Tahlen" hammer is a one-pound tool, with Tenite tips measuring  $1\frac{3}{8}$ " in diameter, designed for use wherever it is necessary to avoid marring surfaces—in machine shops, die shops, automobile repair shops, metalworking shops, furniture manufacturing plants, etc. The tough, resilient plastic tips withstand heavy impact without cracking or flaking; they are force-fitted directly onto the grooved nipples of the hammer head. The tips are injection molded of clear amber Tenite, a cellulose acetate butyrate product of Tennessee Eastman Corporation. The hammer is manufactured by Tahlen Industries, Ltd., Vancouver, B. C. It has only

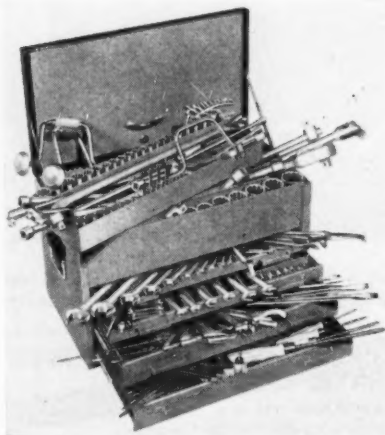
recently been introduced to the United States. For complete information, write to the firm's American distributors:

**H. F. Soderling Co., Dept. BB**  
1745 Fourth Ave., So.  
Seattle, Wash.

## THE WILLIAMS "SUPERCHEST" NO. 2001

Williams' new "Superchest" No. 2001 could easily be called the answer to a mechanic's dream. It contains an amazing combination of "Supersockets" and attachments in  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$ " drives; "Superrenches," Pliers, Chisels, Screwdrivers, etc., totaling 146 pieces in all. Every tool has been selected to cover a wide range of work from ignition and electronics to truck, bus and industrial applications.

"Superchest" is constructed of heavy gauge steel, reinforced and welded. It is built to last a lifetime, according to its manufacturer. Drawers with handy compartments operate on free-acting suspension slides. A removeable "tote"



tray gives easy access to the roomy interior and has convenient compartments which keep sockets at their proper height within easy reach. Literature is available upon request by writing to:

**J. H. Williams & Co., Dept. BB**  
400 Vulcan St.  
Buffalo 7, N. Y.

## ATLANTIC GEARS

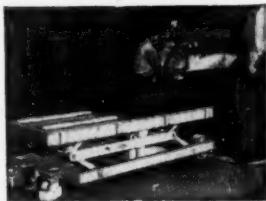
precision-cut and inspected, on new, latest equipment. All sizes and types. Send samples or blueprints for quotation.

**ATLANTIC GEAR WORKS, INC.**

198 Lafayette St., N.Y. 12, N.Y.  
Phone CAnal 6-1441

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and  
DIE  
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Raymond



Corporation 772 Madison St., Greene, N. Y.

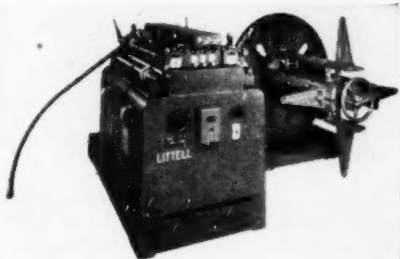
### LITTELL COMPACT STRAIGHTENING MACHINE WITH CENTERING REEL

To meet the increasing trend toward space-saving in modern plants, the F. J. Littell Machine Co., has produced a compact unit designed to fit into cramped floor space. The unit consists of a No. 438-7PD continuous straightening machine complete with a No. 60-36 automatic centering reel, both mounted on a common base.

Built into the straightening machine unit are such features as pinch rolls  $4\frac{1}{2}$ " dia. x 38" long, one set on each end. The seven-roll straightener has rolls  $2\frac{1}{4}$ " dia. x 38" long. Upper straightening rolls are ball bearing. Lower straightening rolls are power driven. The unit is equipped with 4-to-1 variable speed, 5 h. p. drive, to give a speed of from 225" to 900" per minute.

The reel features an electric brake to apply when the power is off on the straightening machine. The reel is of the automatic centering spindle type, not motor driven. The reel base is

mounted in slots for forward or backward adjustment in relation to the straightener. The coil capacity is 6,000 lbs. up to 36" wide, with an i.d. of 16" to 20 $\frac{1}{2}$ ". The floor space for the en-



tire unit (reel and straightener) is 72" wide x 90" long. For details, write:

**F. J. Littell Machine Co., Dept. BB**  
4153 Ravenswood Ave.  
Chicago 13, Ill.

### Save Space and Lifting

Yohe Handy Rack floor stands take less space, hold more stock and require less lifting. Four arm rack - 51" high stacks, 10,000 lbs. Five arm rack 57" high holds 12,000 lbs. flat or round stock — at safe lifting heights. Use against wall or back-to-back in center of room.

Let us send details and prices

**WM. S. YOHE SUPPLY CO.**  
503 Mahoning Rd., N.E. Canton, Ohio



## PECK



**SCREW MACHINE PRODUCTS**

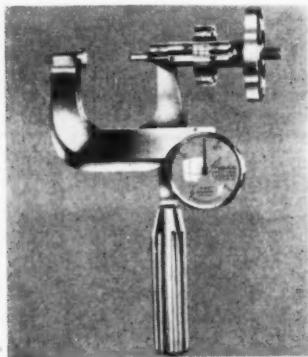


Complete facilities for automatic and secondary operations. Limit in size to 1 $\frac{1}{4}$ " dia.

**PECK SPRING CO., PLAINVILLE, CONN.**

### AMES PORTABLE HARDNESS TESTER

The new Model 2 Hardness Tester just introduced by the Ames Precision Machine Works weighs only 2½ lbs.; it is convenient and easy to operate as well as having accuracy and durability, according to its manufacturers. The new device is for testing larger dies, knives, cutters, saws, round and flat stock, tubing, odd-shaped parts, etc., up to 2". It can also be used for testing further in from the edge of sheet stock.



The Rockwell Penetration Method of testing the hardness of metals is accomplished with the new Ames unit by applying pressure to the penetrators by screw action. Tests are made directly in the Rockwell Scales, with the penetrators and pressure loads specified in the Rockwell Conversion Chart. Brinell equivalents can also be determined. As the large handwheel is turned to increase the pressure, the tester frame is forced open, the lever on the front of the frame lifts, causing the indicator hand to move around the dial. The action can be continued indefinitely without altering the frame.

Advantages include savings in time and effort due to the portability of the device, as well as the advantage in testing bars and sheets without cutting off samples, and in testing long knives, large saws, cylindrical parts, assembled units and odd-shaped parts.

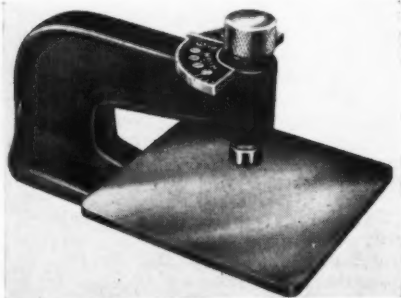
Complete equipment includes one diamond penetrator, one 1/16" ball pen-

etrator, one short and one long flat anvil, one short and one long V anvil, two hard steel test blocks, one brass test block, and a Rockwell Conversion Chart, packed in a wooden box with hinged cover. For complete information, write:

**Ames Precision Machine Works**  
131 Lexington St., Dept. BB  
Waltham 54, Mass.

### TIMESAVER MICROMETER TYPE GAUGE

Designed originally for use in the printing trade, this new gauge has found many applications in the metal working industry. A large easily-read dial provides a range of plus or minus .015". The gauge is normally furnished with a spindle of correct length for the work to be gauged with an adjustable feature providing a variation of about 1/8". The throat is slightly over 4" deep.



The gauge has a ground table surface 6" square. Due to the deep throat, the TimeSaver gauge is not extremely sensitive, but in the hands of a skilled operator, it will gauge to tolerances of .00025 or better. The device is available in two sizes; No. 1 has a length of 10", width of 6", height of 5¾", and weighs 6 lbs.; No. 2 is 18½" long, 12" wide, 6¾" high; weight is 19 lbs. For complete information, write:

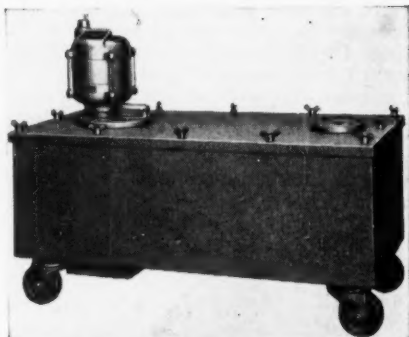
**Timesaver Products Co., Dept. BB**  
44 Salina St.  
Pulaski, N. Y.

## GUSHER PUMPS SUPPLIED WITH EXPLOSION PROOF MOTORS

The Ruthman Machinery Co., manufacturers of Gusher Coolant Pumps, have recently developed an explosion proof polyphase motor in sizes  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  h.p., which is available for any Gusher Pump within this horsepower range. These motors are suitable for use in hazardous locations and have passed the Underwriters' Laboratory test "Class I, Group D"; they are available with Underwriter label, when requested.

The illustration shows the Model UL-7124-EXP, installed on a totally enclosed portable tank. This unit, with a  $\frac{1}{4}$  h.p. explosion proof motor, was developed for pumping high volatile inks, in the printing industry. There is a wide variety of other applications for Gusher Pumps, in handling many liquid up to 150 s.s.u. at 100° F.

This unit is equipped with a one-piece heavy vertical shaft, accurately ground, which rotates on large precision sealed



ball bearings, pre-lubricated for life. High accuracy of dynamic balance is obtained by electronic process. For complete information write.

**The Ruthman Machinery Co.**  
Dept. B.B.  
Cincinnati 2, Ohio



**MACHINES TO BEND COLD PIPE, CONDUIT, BOILER TUBING  
AND SOLID BAR . . . BENDING TABLES ALSO AVAILABLE**



Above: Hand powered Type A-30 . . . up to 180 bends . . . all sizes from  $\frac{1}{2}$ " to 2".

Only 7 parts. World's fastest, simplest machine. Note assortment of bending dies . . . this process makes shorter tangents than any other. Occupies only 18" by 18" floor space!

Other Sizes Available

Factory and Main Office:

9 Furnace Street

Poultney, Vermont

## RADIANT HEAT BENDS

For residential work—at 6" and 9" radius bends on  $\frac{1}{2}$ " and  $\frac{3}{4}$ " pipe.

For industrial sizes — at 6" and 9" radius bends on 1" and  $1\frac{1}{4}$ " pipe.

All the above bends and sizes are specified and accepted by most heating engineers and contractors.

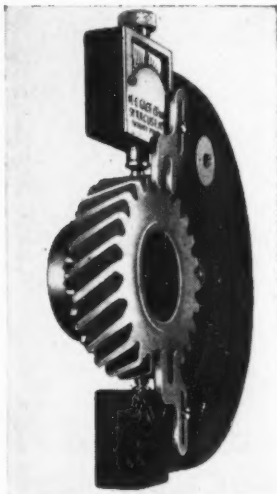
Furnished as extras if required on our Type A-30.

**"American"**  
**PIPE BENDING MACHINE**  
Company INC.



### NEW INDICATOR GEAR GAGE

An efficient gear gage indicator has recently been introduced by the M-G Gage Co. This ingenious device differs from the conventional gear gage in that the pitch diameter of gears in a machine can be checked accurately without disturbing the set-up of the unit. The M-G indicator is built to withstand long usage, and is easily set and adjusted.



The manufacturers state that the Indicator Gear Gage eliminates the element of human error. Production time is cut down to a minimum since operators are able to check their work accurately in five to ten seconds.

The gage is provided with an indicator face with 14 graduations of approximately  $3/32$ " each, representing .001" movement of gage contact point. The main stem of the indicator is held in stationary position, but is retractable to allow the ball point to pass over the gear tooth involute. This stem also houses the upper collet which holds the replaceable ball insert. Adjustable limit fingers permit the use of the indicator to a full .014" or any part thereof. The base of the unit is provided with an

American Gage Design standard adjusting and locking device. Each frame has a minimum of  $1/2$ " adjustment.

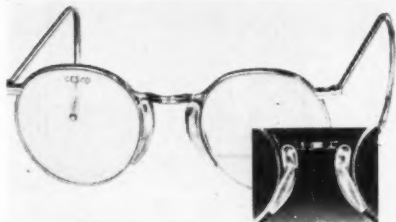
The indicator is also equipped with a fork stop which is adjustable both vertically and horizontally, thereby controlling the positions of gage points on gears being checked. An adjustable adaptor assembly insures that the operator engages the proper teeth, regardless of odd or even number.

Send for 4-page illustrated bulletin for complete details.

**M-G Gage Co., Dept. BB**  
107 N. Franklin St.  
Syracuse 4, N. Y.

### SPECTACLE-TYPE INDUSTRIAL GOGGLES

A Comfort-Bridge that virtually "floats" the goggle in correct position in the feature of the Chicago Eye Shield Co's. redesigned spectacle-type goggles. The broad-bearing large-size pads, plus balanced suspension of the frame, distribute the light weight of the goggle evenly across the nose. The result, according to reports from the manufacturer, is even greater wearing comfort. Comfort-Bridge pads also seal the entire eye area to prevent entrance of foreign particles. Cesco Super-Safety lenses add to the protective features of the goggle. The goggle is constructed by a welding process which makes the frame remarkably rugged. High impact resis-



tance and durability are claimed for the goggle. These spectacle-type goggles are available with three bridge widths and three lens sizes.

**Chicago Eye Shield Co., Dept. BB**  
2300 Warren Boulevard,  
Chicago 12, Ill.



## NEW PILLOW BLOCK WITH "MICROLOCK" ADJUSTMENT

A development which is stated by its designers to represent a revolutionary advance in the field of roller bearings has recently been introduced by the Shafer Bearing Corporation. The improved units offer three exclusive features that have an immediate appeal to engineers experienced in bearing application. The first is the new, stronger



design housings. The second feature is the Shafer "Z" Seal, which has high sealing efficiency, according to its manufacturers, keeping the dirt out, and the grease in; the seal is self-aligning and provides for radial float.

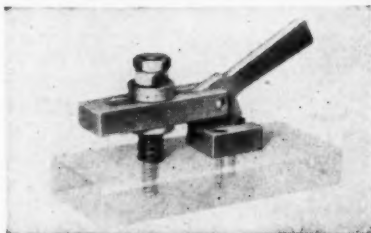
The third feature is the new Shafer "Microlock" Adjustment which permits actual micrometer steps of bearing adjustment (.005" on smaller units, .007" on larger units) with no tools but a screwdriver. No drilling for set screws, with the possibility of chips entering the bearing, is necessary. The adjustment further eliminates the hazard of damaged threads to interfere with the removal of the cover or later modification of the bearing adjustment, if such is desired.

The Shafer "Z" Seals and the "Microlock" with 12-point adjustment are standard features in all Shafer Self-Aligning Roller Bearing Units. For complete specifications, send for 4-page illustrated bulletin:

**Shafer Bearing Corp., Dept. BB**  
801 Burlington Ave.  
Downers Grove, Ill.

# M-T

## FIXTURE CLAMPS and COMPONENTS



There is a M-T Fixture Clamp and Fixture Component to meet your most exacting requirements. Immediate delivery.

*Write for catalog and price list.*

**Morton Machine Works**  
2422 Wolcott Detroit 20, Mich.

## STERLING DRILL GRINDER



### CAPACITY:

$\frac{3}{8}$ " to 2 $\frac{1}{2}$ " drills.  
5" x 9" adjustable table.

**MOTOR:**  $\frac{1}{2}$  hp,  
3450 rpm.

**NET WT:** 250 lbs.

**CRATED:** 320 lbs.

**McDONOUGH MANUFACTURING CO.**  
EAU CLAIRE, WISCONSIN, U. S. A.

### BALL-TILTING MILLING TABLE

A new ball-tilting Milling Table, designated as Model No. 108, has just been introduced by Leo G. Brown Engineering Co., Los Angeles. This useful mill-



ing table is built from fine grain Meehanite semi-steel normalized castings. All parts are of rigid construction, and are precision machined.

The ball will tilt 30° to any angle; the adjustment of the ball angle is performed by loosening one of three Allen locking bolts. An accurate rotary base calibration is engraved for a full 360°; it locks securely with two T-slot bolts in any position without distortion. Each cross feed has Acme thread screw with a bronze nut, and has a six-inch travel slide feed. The cross feed slide bronze gib has three adjustment screws for the takeup of slack.

The overall height of the table when level is 6½". The T-slot is ¾" x ⅞" for a ½" bolt. A similar ball-tilting rotary feed table, with a top diameter of 6¾" is also made by this firm.

For complete specifications, write:  
**Leo G. Brown Engineering Co.,**  
1531 So. Sunol Drive, Dept. BB  
Los Angeles 23, Calif.

### BALL BEARING LIVE CENTER FOR LATHES

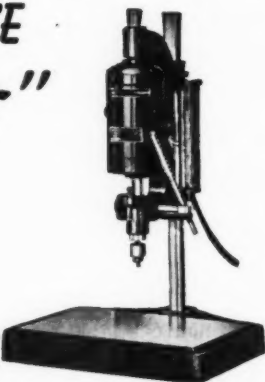
A new ball bearing precision live center has been designed by South Bend Lathe Works to provide the strength

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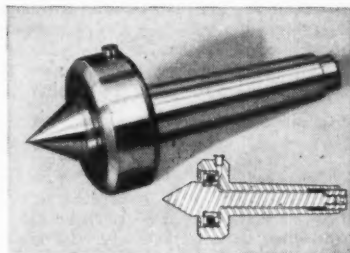
## *Speed-Right*

### ELECTRO-MECHANO

COMPANY

263 EAST ERIE STREET  
MILWAUKEE 2, WISCONSIN

and rigidity required for heavy roughing cuts, and the accuracy for fine work and high speeds. The revolving center is made from electric furnace tool steel, heat treated to a hardness of 61 to 65 Rockwell C. The center point shaft



extends through the taper shank and is supported by bearings at both ends. A specially designed precision ball bearing carries both radial and thrust loads, and the center point whip is eliminated by a rear pilot bearing. All parts are interchangeable and replaceable.

This device is available in two sizes; the smaller having a No. 2, and the larger, a No. 3 Morse Taper shank. Further information on this live center may be obtained from the manufacturer:

South Bend Lathe Works, Dept. BB  
384 East Madison St.  
South Bend 22, Ind.

#### FASTCUT KEYSEAT CUTTERS AND TOOLS

A wide series of Woodruff Keyseat Cutters ranging from 1/4" to 2 3/8" in diameter, in 41 different models and overall lengths, has been placed on the market by Fastcut Tool Div. The firm also manufactures a line of combined center drills and countersinks, in sizes from 1/8" to 3/4" body diameters, with drill diameters ranging from 3/64" to 5/16". High speed steel center reamers and countersinks are also available. Send for bulletin to Fastcut Tool Div., Hilton Manufacturing Co., Dept. BB, 2525 Hilton Road, Ferndale, Mich.

**HEINRICH**

***Grip-Master***

DRILL PRESS TYPE  
SCREWLESS VISE

**PAYS FOR ITSELF  
IN TIME SAVINGS**

MOVES FREELY  
FOR INSTANT  
VISE SETTING

POSITIVE  
LOCKING  
GUARANTEED

Discover for yourself the many ways in which "Grip-Master," the original screwless drill-press vise, can cut production and tooling costs. The secret lies in "Grip-Master's" instantaneous, effortless setting plus a patented "Circle Grip," positive locking mechanism. Wide clearance between bars permits clear-through drilling, built-in parallels save leveling time. Write for details.

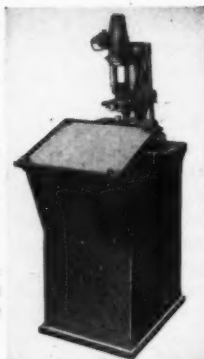
**NATIONAL MACHINE TOOL CO., Dept. 109-C • Racine, Wisconsin**

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Easily . . . Quickly

For checking and  
measuring at differ-  
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Profile Projector (P 215)

## SPECIAL LUMINOSITY FEATURES:

1. Has perfect sharpness of image, right into corners of screen.
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3. Permits examination and checking of the surface of opaque objects.

**Comes complete** with objectives for magnifications 10, 20, 50 and 100X.

**Also**, a graduated rotary screen with hairline cross for degree measurements can be furnished.

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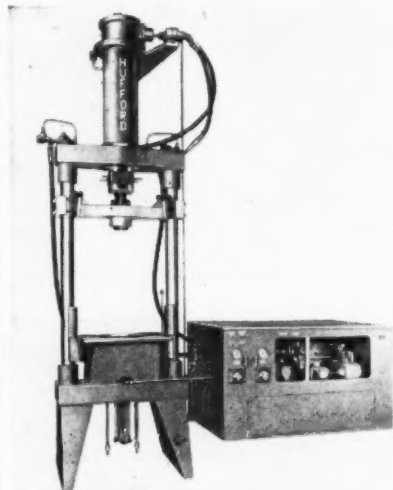
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## HUFFORD "ROTATING TOOL" HYDRAULIC PRESS

This rugged and versatile press was designed primarily for the "hot pressing" of all sizes of threaded and plain porcelain electrical insulators; it is also applicable to general pressing and forming operations of plastic materials, where a combination of controlled tool rotation and preregulated pressing tonnage is advantageous. The unit pro-



vides for two basic operations: (1) where a rotating tool must press and simultaneously descend and ascend to form an accurate thread, and (2) where the forming operation is accomplished by forcing work against a fixed rotating tool.

This unit can be operated as a manually controlled single cycle unit — or as a continuously cycling unit delivering any desired pattern of interlocked motions. Interlocks and assured repetition of any desired cycle are obtained with the Hufford "Mechanical Brain", (see February 1949 MACHINE & TOOL BLUE BOOK, p. 283) a fool-proof timing device employing cam-driven hydraulic valves, positively controlling sequence of ram and tool motions.

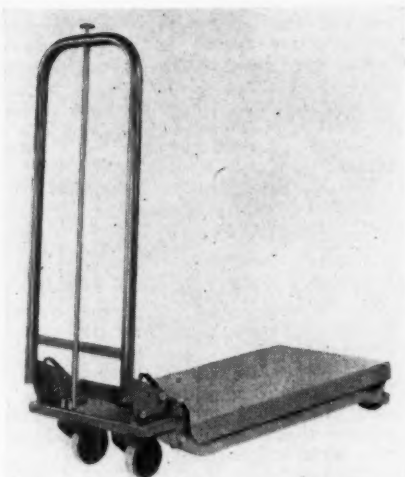
This press will handle a wide range of work sizes. For complete information, write:

**Hufford Machine Works, Inc.**  
**Dept. BB**  
**Redondo Beach, Calif.**

#### **BARRETT HALF-TON LIFT TRUCK**

The Barrett "HT" Lift Truck pictured, is again in production and available for immediate delivery. Quantities of this popular half-ton lift truck are in use in various industries.

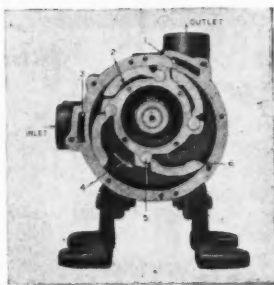
The vehicle can be employed as a general purpose floor truck as well as a conventional lift truck. It was designed for the economical handling of loads up to 1000 pounds. Operation is simple, rapid and effortless. The operator simply pulls down the bar handle one stroke, and the load is elevated. A full 2-inch lift is provided. To settle the load to the floor, the operator presses the thumb handle release and eases the handle upward. The load is pushed or pulled by using the convenient bar handle. The unit's width



of 18 inches permits use in narrow aisles.

This lift truck is of welded construction throughout, which gives strength

#### **LEIMAN BROS.— ROTARY POSITIVE**



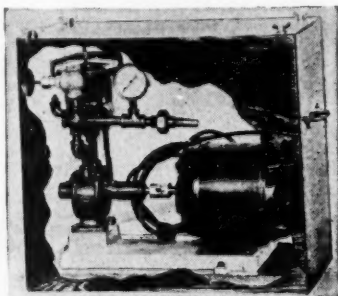
For picking up and carrying sheets of paper, cardboard, tin or other materials; in bottle filling operations; for agitating solutions, aerating water; canning machines, gas and oil burning appliances; for etherizing, vacuum treatments, wound cleaning; in filling bags, cartons, collapsible tubes.

**LEIMAN BROS.**

## **VACUUM PUMPS**

### **AIR MOTORS — GAS BOOSTERS PRESSURE BLOWERS**

**with the  
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that  
TAKE UP  
THEIR  
OWN WEAR**



**A PORTABLE UNIT**

**169-1 CHRISTIE STREET**

**NEWARK, N. J.**

combined with a weight of only 108 pounds. Its light weight has proved an effective factor in keeping down "afternoon fatigue." It is made with lowered heights of 3½, 6, 7 and 9 inches, and with carrying frame lengths of 36 and 48 inches.

Further information may be obtained from:

Barrett-Cravens Co., Dept. BB  
4509 S. Western Blvd.  
Chicago 9, Ill.

#### LINCOLN HARD SURFACING POWDER

An improved hard surfacing powder, called Surfaceweld A, has been made available by The Lincoln Electric Co. The powder, to be applied with a carbon electrode, is used for depositing a thin chromium carbide type of hard surface that is highly resistant to abrasive wear and corrosion.

The operating characteristics of Surfaceweld A give it a wide field of application. An outstanding characteristic is its ability to be used with an a.c. arc with a single carbon electrode. It may

also be used with d.c., carbon electrode negative.

Surfaceweld A is designed for surfacing applications where the use of hard surfacing electrodes is not always practical, as in thin work, pieces requiring thin deposits, and for use with small a.c. welders. It is also used in preference to hard surfacing electrodes for certain conditions of severe abrasion. The powder forms a paste when mixed with water which adheres to flat and curved surfaces.

The hardness of the smooth dense deposit of Surfaceweld A is approximately 54-61 Rockwell C for one layer and 57-63 for multiple layers. Hardness depends somewhat on the amount of admixture. The deposit develops full hardness in the as-deposited condition; it maintains hardness and resists scaling at high temperatures. Corrosion resistance is comparable to that of stainless steel. Further information is available upon request.

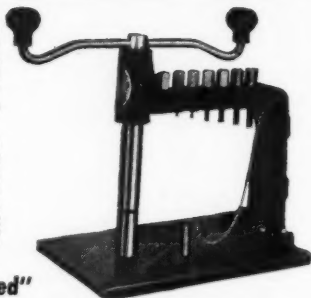
The Lincoln Electric Co., Dept. BB  
Cleveland 1, Ohio



## The Quick, Easy, Handy Way to TAP BY HAND

THE DAHLSTROM TAP GUIDE virtually eliminates tap breakage—and saves those costly hours spent prying broken taps out of dies. Saves time, too. Just a few turns of the handle and the job is done.

Winds through continuously, with no backoff. Work is always dependably straight and square. Fasten it to a post or set it on top of a big job. This handy tapper comes equipped with 7 adaptors, 8-32 to ½" but taps are not furnished. Spindle can be pulled out and used in a lathe, or use it as tap extension for hard-to-get-at places. 13" x 8" x 14", wt. 32 lbs. DAHLSTROM MFG. CO., 2506 WEST LARPEUR AVE., ST. PAUL 8, MINN.



SEND FOR FREE CIRCULAR: "Tap Breakage Reduced"

# Dahlstrom TAP GUIDE

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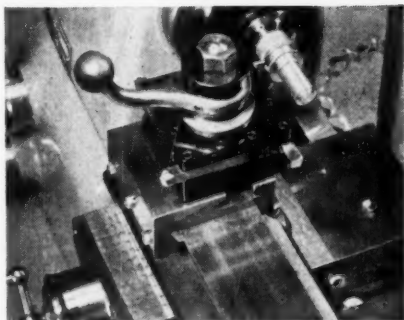
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1949

## HARDINGE AUTOMATIC SQUARE INDEXING TURRET

Hardinge Brothers, Inc., have announced a new Automatic Indexing Square Turret for the compound slide of Hardinge Precision Lathes. The new square turret can be applied directly to the tool post T-slot of the compound slide. The turret will accept four standard 5/16" square tool bits. Accurate indexing is accomplished through a hardened and precision ground tapered index pin which locates in mating hardened and precision ground stations.

The turret indexes rapidly by a simple movement of the ball handled lever. Moving the lever, the turret is automatically unlocked, indexed to the next tool position and relocked, ready for the next machining operation. For addition information on this useful device, write:



Hardinge Brothers, Inc., Dept. BB  
Elmira, New York

## VARIABLE SPEED TRANSMISSION FOR HIGH TORQUE APPLICATIONS

All speeds from top to zero (and reverse, if desired) are available in the new Graham double spur reduction models which are used where high

torques and low speeds are required. This compact unit incorporates in one "package" the motor, variable speed transmission and gear reducer. The

## STRAIGHT OR SPIRAL • WET OR DRY

# NO SKILL REQUIRED FOR AUTOMATIC FLUTING

Even a novice can accurately grind straight or spiral flutes from solid stock on the Wardwell Automatic Flute Grinder.

Grinds taps and reamers from 1/16 to 2"; also teeth in milling cutters, angular cutters.

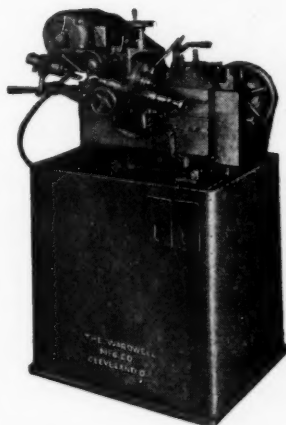
Sharpens saws in gangs up to 3 3/4" long, with diameters ranging from 1/2" up to 8".

Grinds and resharpens reamers from 1/8" up, with spacings of 2 flutes and more.

Can be adapted to many special grinding problems.

WRITE FOR BULLETIN 50FS

**Wardwell Automatic Universal Flute Grinder**  
**Produces Precision Tools With Unskilled Labor**



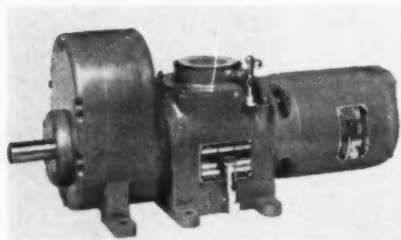
**THE WARDWELL MANUFACTURING CO.**  
3165 Fulton Rd. Cleveland 9, Ohio

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micrometer control makes it possible to set the speed within 1/400 of the dial periphery, assuring extreme accuracy of speed holding and speed re-



set over the entire range, the manufacturer states.

The double reduction model is available in sizes from 1/4 to 1 1/2 h.p. with speeds ranging from 75 r.p.m. to zero to 9 r.p.m. to zero. Other models are available in sizes down to 1/30 h.p.

The transmission is an all metal drive using hardened, ground alloy steel traction members. The first stage of gear reduction uses a steel pinion and a Meehanite gear; the second stage uses alloy steel pinions and gears. For complete information on these units, write the manufacturer:

Graham Transmission Inc., Dept. BB  
3754 No. Holton St.  
Milwaukee 12, Wis.

#### NEW HEAVY-DUTY CEMENTED CARBIDE TOOLS

A further expansion in its line of "Kennamatic" Tools has been announced by Kennametal Inc. Four heavy-duty tool styles are now available, two having square inserts and two having cylindrical inserts of solid Kennametal cemented carbide.

These tools utilize the "Kennamatic" principle of mechanically holding an indexable insert in vertical position, in order to make best use of the high compressive strength of the Kennametal insert.

Heavy duty "Kennamatic" Styles

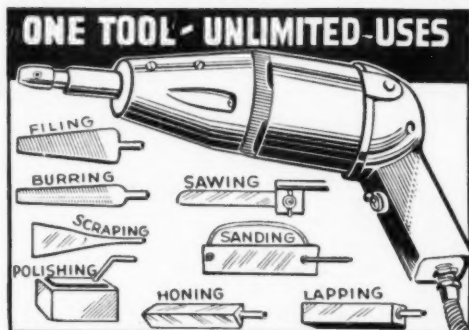
## EXPEDITE FINISHING OPERATIONS with

### RECIPROCATING ACTION TOOLS

Portable—Light in Weight

Easy to Use—A Real Time

Saver in Any Shop.



Many hand finishing operations can now be done quicker, easier and more accurately with these electric tools. Deliver 1000 PUSH-PULL strokes per minute. Fixed strokes are either 1/8" or 3/8" long. Operate on 110 Volts AC or DC.

Write for Catalog.

**ACME TOOL COMPANY**  
71 WEST BROADWAY  
NEW YORK 7, N. Y.

3RK and 6RK have cylindrical inserts that are  $1\frac{1}{2}$ " in diameter x  $2\frac{1}{4}$ " long, held in 2" or 3" square steel shanks. These tools are intended primarily for machining cast-iron. Heavy duty Styles 11SK and 12SK (illustrated) are avail-



able in two shank sizes—2" square, with  $1"x1\frac{1}{2}"$  square Kennametal inserts; 3" square, having  $1\frac{1}{4}" x 2"$  square Kennametal inserts. For complete particulars, write the manufacturer:

**Kennametal Inc., Dept. BB**  
 Latrobe, Pa.

Only \$29<sup>50</sup> prepaid  
 MONEY BACK GUARANTEE



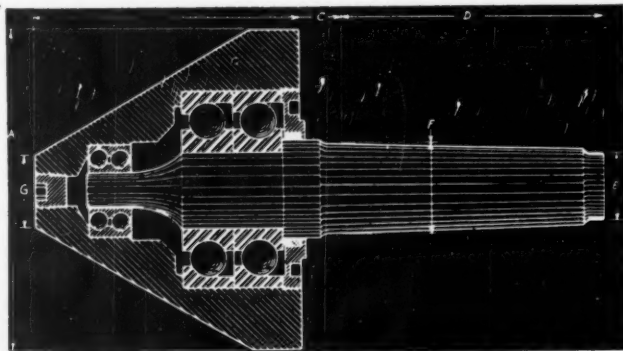
## WAR SURPLUS SURFACE PLATES

BRAND NEW Precision surface plates. Finest quality Hand Scraped. Manufactured by CHALLENGE MACHINERY CO. Original factory packing.  $12"x18"$  with  $\frac{1}{2}"$  thick plate, 3" ribs. Complete with durable wooden protective cover and wooden handles. Made to strict Gov't. specifications. A buy you can't afford to miss!

10 DAYS TO RATED ACCOUNTS  
 ORDER BY MAIL  
 SEND CHECK OR MONEY ORDER.  
 All Prices F.O.B., Denver, Colorado

**ASSOCIATED TRADERS, INC.**  
 255 Kalamath St., Denver, Colorado

## BULL NOSE HEAVY DUTY LIVE CENTER



In this type Roofs Live Center the spindle is mounted on high quality Duplex Ball Bearings in the large end and a Double Row Ball Bearings in the small end of the nose. Perfect alignment with any type of work.

Range of diameters are, No.  $2\frac{1}{2}"$  to  $3\frac{1}{4}"$  and No. 7-2" to  $7\frac{1}{2}"$  permits the use of a single center for a variety of diameters, suitable for pipe and other hollow equipment.

**HOUSTON GRINDING & MANUFACTURING CO., INC.**  
 2110 Quitman Street, Houston 10, Texas  
*Reliable Distributors Wanted*

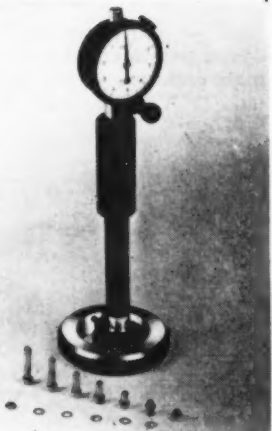
## LARGE NILCO DIAL BORE GAGES

Nilco Dial Bore Gages for simplified checking of bores, embodying a design for simple adjustment and maintenance, have recently been introduced. These gages stress faster setting, thus maintain greater accuracy for a longer time. Maintenance cost will be considerably reduced, as anyone can disassemble and reassemble these units in a few minutes, as well as clean and replace parts after they have been in usage. The adaptability of the indicator will also assure less breakdown time, as the indicators can be easily interchanged with any type of indicator available.

Five gages cover a range from  $\frac{7}{8}$ " to 12", and are standard with a tenth indicator. They are adaptable with any other type of indicator of any graduation, make, or model of the American Gage Design standard class.

The gage is set quickly, as the range extension consists of the extension, the washers and the nut. The approximate adjustment of the gage to specific

dimensions is obtained by selecting the correct range extension and washers. When these are selected, the bore gage is then set in a master ring or gage



SPROCKETS • FLEXIBLE COUPLINGS  
SPEED REDUCERS  
INDUSTRIAL EQUIPMENT, ETC.

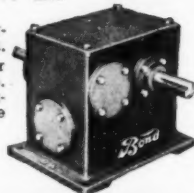
YOU, our customer, are the most important person we know, whether you enter our

doors by mail or in person.

This fact is reflected in the service we give and the price you pay.

We welcome the opportunity to prove this to you.

If you do not already have our latest Stock Gear Catalog (No. 63) write us at the Philadelphia office and we will be glad to send you one.



CHARLES

**Bond**

COMPANY

617 Arch St., Philadelphia 6, Pa.

blocks. The final setting for the zero reading in the first quarter of the dial is made by simple adjustment of the indicator.

Three-point alignment and two-point gaging principle is used in this gage. With this arrangement, direct setting can be made to gage blocks for short runs or occasional set-up jobs, and no masters are needed.

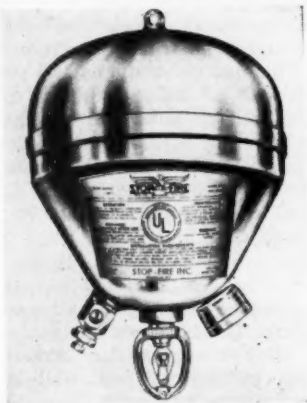
The indicator reflects bell mouth condition, out-of-roundness and gives the size of the bore. The gage is especially useful for quality control. It can be used in the toolroom for checking or making gages, or in the production shop or laboratory for final inspection. For complete information, write:

**Nilsson Gage Co., Inc.**  
2A Lake St., Dept. BB  
Poughkeepsie, N. Y.

#### PORTABLE AUTOMATIC SPRINKLER FIRE PROTECTION

Stop-Fire, Inc., manufacturers of fire protection equipment, announce Underwriters' Laboratories listing of their

Automatic Sprinkler "portable system" fire extinguisher. This economical unit, constructed of heavy brass, silver welded, requires no piping. Simply hang it



up, and it is ready to operate, utilizing the new fire extinguisher fluid known as C.B.M. (Chlorobromomethane).

## How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through this center. The hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes. The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

**BUSHINGS MADE IN  
FOLLOWING SIZES:**

1/4. 3/8. 7/16  
1/2. 5/8. 3/4. 1"

Some Territories Still Open to Jobbers

**STURDY BROACHING SERVICE**  
23516 TELEGRAPH RD., DETROIT 19, MICH.

Patents Pending



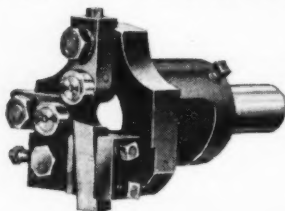
*Write for  
Literature*

Flame does not have to touch this unit. When fire occurs, heat waves cause an approved sprinkler head, (like those on some automatic water systems), to discharge under pressure a wide, fast-moving spray of combined carbon dioxide and atomized Chlorobromomethane. This quickly blankets and snuffs the fire, with no residue, stain, or damage. The solution is said to be equally efficient on oil, grease, flammable liquid, lacquer, paint, solvent, or electrical fires. It is non-freezing, and has a minimum specification capacity of 700 cubic feet. During a recent test in a paint spray booth set up out in the open, the unit extinguished a fiercely flaming lacquer fire in one-half second. The official Underwriters' Laboratories report book covering this automatic unit will be sent without obligation, upon request by writing to:

**Stop-Fire, Inc., Dept. BB**  
**125 Ashland Place**  
**Brooklyn 1, N. Y.**

## **WATSON**

### **Tangent Cut Box Tool**



A general purpose, tangent cut, roller rest box tool of wide range for turning diameters from bar stock castings, forgings or other material. Applicable to all sorts of screw, turret and other machines, hand or automatic. It is simple to set and eliminates resetting when it is necessary to grind the bit. Write for descriptive folder giving complete information.

**The Watson Mfg. Co.**  
**2220 ALBION ST. TOLEDO 6, OHIO**

## **MULTIPLE STATION PISTON GAGE**

To facilitate the assembly of automotive pistons Pratt & Whitney, Divi-

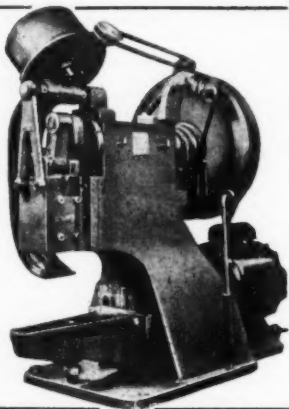


sion of Niles-Bement-Pond Co., announces a specially designed Multiple Station Piston Gage which checks six

## **SAVE TIME AND MONEY**

Edward Segal presents the most modern time-saving eyelet attaching machine.

- Can be set for single and multiple eyelets.
- Will take all sized eyelets.
- Low maintenance.
- Raceways and tools changed in minutes.



**EDWARD SEGAL**  
*Mfrs. of Eyelet Attaching Machines*  
**25 Beekman St. N.Y.C. 7, N.Y.**

dimensions simultaneously, stamps two grades, and automatically shows the number of pistons of each grade inspected. This gage uses Pratt & Whitney Electrolimit and Multiple Electric Contact gaging mediums.

When the inspector pushes the piston into gaging position, the gage is in operation. The instrument panel indicates to the inspector the complete information on each piston. At the same time, the piston is automatically marked on top with the grades of the skirt diameter and the pinhole diameter.

The meter at the left indicates the grade of pinhole diameter and operates the second row of lights at the top of the gage. The meter at the right indicates the grade of skirt diameter and operates the top row of lights. The width of the ring grooves are checked by the red and green lights in the center. A green light means undersize and the red light, oversize. When neither light is on, the ring groove width is within size.

The counters at the bottom show the total of each grade of skirt diameter which has been gaged. For details, write

**Pratt & Whitney, Dept. BB**  
**Div. Niles-Bement-Pond Co.**  
**West Hartford 1, Conn.**

#### **DETROIT FIRM OFFERS THE MOREY PROCESS**

A recently-established Detroit firm has obtained exclusive licenses for the Morey Process of precision hard chrome plating materials to size. The new firm is known as the Chrome Electro-Forming Co., located at 7515 Lyndon Avenue, Detroit 21, Michigan. The telephone number is University 3-1580.

Many distinct advantages are claimed for this newly-developed process of hard chrome plating, including closer control of plate thickness, superior throwing power, better adherence and ductility of the plate, less porosity and superior finish. The company welcomes opportunities to display to potential users examples of the Morey Process.

#### **NOTCHING TUBING OR PIPE ENDS EASILY WITH**

### **ARC-FIT**

Patent No. 2,126,519

#### **IN POWER PRESS OR HAND PRESS**

Arc-Fit is a notching unit for preparing pipe or tubing ends in making welded or brazed tubular joints. Arc-Fit will prepare the ends of a pipe or tube in less than 5 seconds. Arc-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

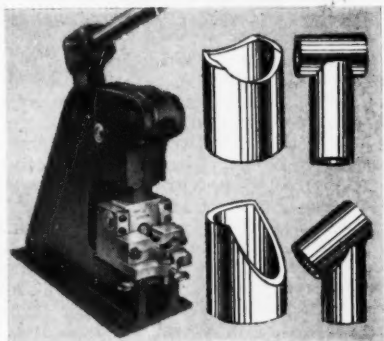
- Arc-Fit can be utilized in any power press.
- Arc-Fit can be furnished for any size tubing or pipe.
- A hand press can be supplied with Arc-Fit units for shearing pipe or tubing sizes 2 inches or under.

Manufactured Exclusively by

## **VOGEL TOOL & DIE CORPORATION**

2525 Moffat Street

Chicago 47, Illinois



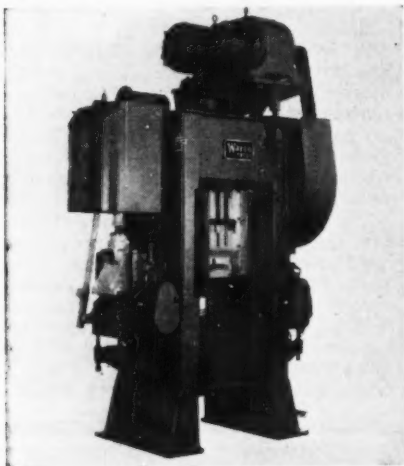
- For sizes over 2", angular cuts other than 90°, and slotting operations. Quotation furnished on request.
- Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
- Engineers can now design for tubular construction and cut costs.

Write today for circular and prices.



## WARCO 75-TON HIGH-SPEED STAMPING PRESS

The Warco Press Division of The Federal Machine and Welder Co., has recently designed and built a 75-ton press capable of producing a great number of stampings accurately and continuously at high speeds.



This press is of welded and stress-relieved steel construction with hand-fit square gibbing to assure accurate alignment. It is equipped with full eccentric shaft with extra long, rigid supporting bearings. The adjusting screw is the barrel type with a short, rugged one-piece Pitman, assuring a rigid connection. The press is equipped with air counterbalancing to reduce shock of "break-through." All wearing surfaces are assured of proper lubrication by an automatic lubrication system. The press is provided with variable-speed drive, convenient location of all adjustments, and provision for the installation of die cushions, if required.

Auxiliary equipment includes a Warco Precision Double Roll Feed designed for high-speed operation; all moving parts are designed to keep weight to a minimum consistent with strength and rigidity requirements, which results in greater feeding ac-

curacy. Infinite variation is possible in feed lengths, from zero to maximum.

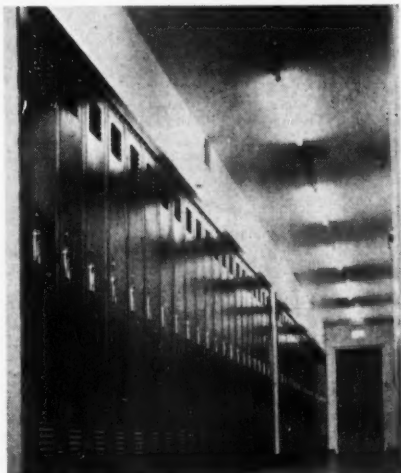
For complete specifications, write the manufacturer:

**The Federal Machine & Welder Co.  
Dept. BB  
Warren, Ohio**

## LYON STEEL-WOOD LOCKERS

Lyon Metal Products, Inc., has announced a new line of steel-wood lockers. The entire framework and doors are of steel, while all other parts are of steel re-inforced masonite. All steel parts are finished in green enamel and the masonite is its natural brown color providing a pleasing contrast.

These steel-wood lockers are provided with the manufacturer's exclusive recessed handle, finished in satin chrome. Number plates fit right in the handle. Lockers are made in both single and double tier in standard sizes. Accessories include steel sloping tops and



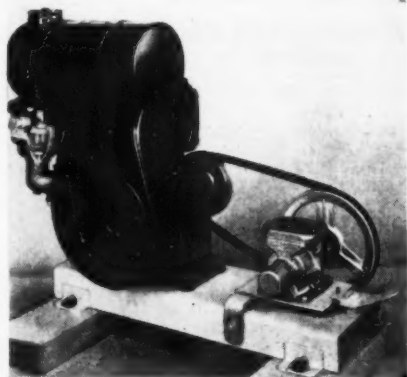
closed bases. These lockers are also available without legs where recessing is desired. For complete specifications write to K. L. Vehe, Sales Dept., at:

**Lyon Metal Products, Inc., Dept. BB  
Aurora, Ill.**



### NEW ECO PORTABLE PUMP UNIT

A new portable pump unit is announced by Eco Engineering Company, manufacturers of gearless pumps. The new unit consists of an Eco Gearless Pump, Model PP-2, powered by a 1½ h.p. single cylinder, four cycle air cooled gasoline engine. It is designed for use on boats and docks, in boat yards, in industrial plants, wherever a portable type emergency pump is required. It has many practical applications. In boat yards its portability permits it to be carried from one boat to another, for pumping bilge, for washing hulls on the railway, for washing decks and upper structures of boats. In plants, it can be used for draining flooded cellars, pumping out cesspools, and for sump cleaning. Its general utility and portability lend itself to these and many other uses.



The belt can be removed by simply raising the pump, which is hinged. When the pump is not in use, the engine can also be used to run a generator, lathe, saw, drill press, sander, or similar motor-driven equipment. Dimensions of the unit are approximately 18" high x 18" long x 15" wide. For detailed description, write:

Eco Engineering Co., Dept. BB  
12 New York Ave.  
Newark 1, N. J.

## SCHERR aids to precision — production

### WILDER MICRO PROJECTION

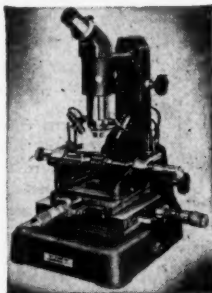


### Magnified precision at low cost

A bench inspection tool that tells the whole truth at a glance. Adapted to constant checking of close-limit production, instantly spotting tool wear or other cause of inaccuracy. Ideal for checking threads and similar work. The Model A Wilder Projector is today saving its cost many times over in hundreds of shops, by preventing rejects. Write for full data and interesting low price.

### WILDER TOOLMAKERS MICROSCOPE

Are you doing government military work? Here is the tool you need to check the new Unified Screw Thread, a combination of British and American standards, now required on all military production. This tool measures two ways with micrometer to .005", or closer with gage blocks. Gives both shadow and reflected image. At a price any shop can afford.



Write for full details on these tools, and for the Scherr Small Tool Catalog.

**GEO. SCHERR CO., Inc.**

198 - Lafayette St. New York 12, N. Y.

# Improved **SELLING TECHNIQUE** **FOR MORE SALES**



## Lecture No. 12

### **EFFECT OF QUANTITY ON MACHINE SELECTION**

by

**J. R. Weaver**

Works Manager, Westinghouse Electric Corp.,  
East Springfield Works

### **ANALYZING THE BUYER'S NEEDS**

There are three reasons for buying new equipment: as a part of an overall replacement program; to keep pace with new product development or design changes; a means of reducing manufacturing costs as either a result of increased production or reduction of man hour time. A salesman must familiarize himself with all the ramifications which these reasons for buying equipment engender. A salesman must know whether a special machine is indicated or a general machine. He must know the buyer's problems and the problems of the buyer's firm.

For quite a few years, in my earlier work with Westinghouse, I held that sometimes enviable position known to sales engineers as the "equipment buyer." Someone once defined a buyer as - a talkative, silent, irritable, likeable, know-it-all, undecided die-hard who won't give a sales engineer five minutes to prove

that he can eliminate 25% of the buyer's manual labor, reduce the cost of the product and, at the same time, double production.

That self - contradictory definition should indicate to you that the buyer has his problems, and placing an order

is not necessarily his greatest problem.

Basically, there are only three types of requirements which create a need for a new machine tool. You are probably all familiar with the customer who has decided to replace worn-out or obsolete equipment. Therefore let's segregate the replacement order and call it requirement number one. Most large organizations have developed replacement plans which are now showing major economies. We developed and followed such a plan a number of years ago at our East Pittsburgh Works. In the process of setting up our procedure we found, to our amazement, that we had more than 100 machines in our plant which we were not using. We eliminated the excess equipment, of course, with a resultant decrease in our departmental costing rates. Our customers benefited accordingly.

A good replacement plan will show up machines which are not operating efficiently and further analysis in most cases, will show that these inefficient machines can be replaced with new equipment to make additional savings possible.

You can assume that most large organizations have a replacement plan and while there may be some variance between companies, the pattern is fundamentally the same.

The replacement of equipment systematically by tool-using companies can create a stabilizing effect upon the machine tool building industries.

Some of the more stable newer industries, which have not yet faced the problem of obsolescence of equipment, should be familiarized with the "facts of life" on replacements. May I suggest this subject to you as a possible approach to the buyers who are not yet old hands in the machine tool game. Although we recommend a plan, it should be pointed out that no plan will permit a tool-using organization to say that on Friday, July 23rd, at two minutes past 2:00 p. m., machine No. 606 will be obsolete.

There is no simple fixed rule. It is safer to treat cases and the best replacement plan will not do much more than bring up individual cases for consideration at the proper time. The mere fact that some builder has streamlined his equipment does not make less beautiful equipment less efficient or undesirable.

Specifically, the survey and replacement plan which we developed at East Pittsburgh resulted in a decision to set aside \$500,000 annually to carry through our program. Management recognized the need when the plan defined the problem

# Here's help



## for shops machining stainless steel...

THE increasing use of stainless steel is presenting new machining problems. D. A. Stuart Oil Co. has collected valuable information on this subject and is well qualified to assist the industry. For example: a Wisconsin plant tapping Type 310 stainless was getting but 50 holes per tap. With Stuart's ThredKut 99 they secured 550 holes. In another plant producing a Type 304 stainless steel union a change to a blend of Stuart's ThredKut 99 increased output from 18 to 31 pieces per hour.

These results are not exceptions. It is simply that study plus trial and error on thousands of stainless steel jobs has given D. A. Stuart a worthwhile fund of knowledge. For assistance write, or call a D. A. Stuart representative.

**STUART** service goes  
with every barrel



**D. A. Stuart Oil Co.**  
EST. 1883

2739½ S. Troy Street, Chicago 23, Illinois

intelligently. If you will remember, a half million dollars bought more than a half dozen pieces of equipment in those days!

As you have concluded, quite a few orders were born as the result of presenting the problem of replacement to management in an orderly, systematic manner. Sales engineers should always remain aware that the buyer plays a major role in developing and following through with a replacement plan and to do the best job, he needs the help of sales engineers who understand his objectives.

Let's look at basic requirement number two which creates orders for machine tools. It is axiomatic that a company can move in only one of two directions. The "no parking" sign is always out. If a company is to remain a prospect or a customer of the machine tool industry, it must be progressive; a progressive company is continually planning for the future. The plans may be for expansion of present production or the development of a new product, or they may be plans for retrenchment. Action on plans for expansion and new products

naturally is more frequent during good times.

The third basic requirement which creates orders for machine tools is the reduction of costs. A good fair weather or foul weather measure of a progressive organization is the degree of concern it gives to the reduction of costs. You are all familiar with that old bromide "you chase costs or costs chase you." Cost reduction is more often a matter of mills than it is of cents or dollars in the electric appliance industry. In our plant at East Springfield we have learned the wisdom of maintaining a Cost Reduction Group. The engineers in this department are continually poring over product designs and methods to squeeze out the last mill of unnecessary manufacturing expense. Orders for new machine tools quite often originate from a cost-saving method resulting from a product design change recommendation.

I would like to give you a good example of this point. Less than a month ago we placed an order which was the direct result of a regular weekly conference of our methods and cost-reduction



REAMER KELLER

engineers. Here is what happened. The group met to discuss the cost of one particular punching which requires a tapping operation. An analysis of the time value indicated that the only possible way to cut the cost lay in the tapping operation. Unfortunately, the examination of the demand showed that at no time in the brightest future would the quantities manufactured pay for the cost of automatic equipment.

It would have been easy to stop there but it was decided to make a survey of all punchings in this section to determine if lots of similar punchings might be combined. The survey took several weeks - as you will understand when I add that we run about 600 different styles of punchings in one week's time.

As a result of the survey we found eight different styles which were somewhat similar in size, shape, cycle and operations. We then learned that each one of those subjects is a low-activity item.

However, we totalled the activity and found that we entered into the area where automatic tapping might be economical. We were then able to think in terms of thousands of units per hour.

To make a long story short, we found a machine which could be tooled basically

for the tapping operation and with eight sets of quick-change adapters, we eliminated the hand-tapping operation on eight punchings. The adapters permitted us to retain the automatic features of the machine which included a dial feed.

We had started our worrying about costs on one subject and ended up with a saving which could be spread over eight different products.

To summarize: We have, broadly speaking, outlined three basic reasons which result in orders. They are:

1. The replacement of obsolete equipment.
2. The development of new products, expansion of existing production facilities or both
3. Cost reduction

Just as it is true that the several buyers in any large company vary in their personal preferences - for sales engineers - most large companies vary from plant to plant in their manufacturing techniques and products. At one plant you will find that production is necessarily on a job order basis. Since no two customers of the company ever seem to want exactly the same size turbo-generator sets and since each order re-

# SAVE MONEY

USE

## ENCO TOOLHOLDERS

Write for catalogue  
No. 48 giving lathe  
swing and tool size  
used.

Model 4 1/2-S Turret Tool Post Shown above for 14" to 16" lathes

- ★ 12 Position Indexing
- ★ 3 Working Positions for Each Tool
- ★ Hardened Steel Construction
- ★ Accurate Reindexing
- ★ Other Models Available for Lathes 6" to 42" Swing.

Model B Tailstock Turret shown above for 12" to 20" lathes

- ★ Mounts 6 Tools
- ★ Hardened Tapered Indexing Mechanism
- ★ Finger Tip Control
- ★ Turret Lines up Directly with Spindle Center
- ★ Furnished with No. 2, No. 3 and No. 4 MT Arbors

Also Mfrs. of Enco Hexturret Bed Turret for 9" to 16" Lathes.

**ENCO MANUFACTURING COMPANY Dept. 239, 4524 Fullerton Ave., Chicago 39, Ill.**

# SECOMET DIAMOND

**Here's a worth-while investment. Impregnated with carefully selected diamond grains of uniform size, insuring perfect finish with maximum efficiency, "Secomet" Diamond Wheels remove in the same time and at greatly reduced cost, five to six times the amount of carbides or hard metal that could be removed with a silicon carbide wheel.**

*Catalog on request.*

## **J. K. SMIT & SONS, INC.**

157 Chambers St., New York 7, N. Y.  
6400 Tireman Ave., Detroit 4, Mich.  
129 Adelaide St. West, Toronto, Ont.

quires its own engineering, the planning of the organization and its buyer is necessarily in terms of flexibility of manufacturing equipment. For example, the planers, lathes, and millers in this kind of plant must be small enough and yet large enough so as not to place limits on the ingenuity of its own sales and engineering staff. A job shop which must sub-contract much of its production soon finds itself only a marginal competitor in its particular field. The profit of the sub-contractor must go into the quotation of this unfortunately managed institution with a resultant loss of

characteristics. As a rule, the buyer in this kind of situation is not interested in a "nut and bolt" story as we have named it in the merchandising business. The sales story might better concern the versatility of application and the simplicity of operation. And most important, if your general-purpose equipment eliminates operator effort and skill, tell your buyer about it. Keep in mind that operator training time, as well as maintenance, goes into manufacturing expense, thereby narrowing the market for a company's product.

This brings us to the question of how

business from its price - conscious customers.

Let me give you several examples of job orders which one of our plants has received lately:

1. Four 400 kw turbine generator sets for two Gulf tankers

2. Nine main and emergency switchboards for four Gulf, one Greek and four Texas tankers.

3. Three mechanical-drive turbines for four Gulf, one Greek and four Texas tankers

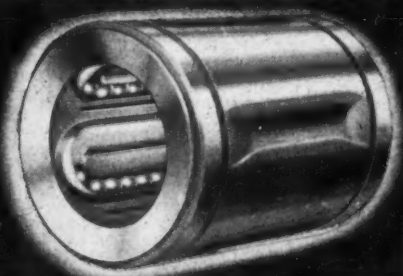
4. Two 400 kw turbine generator sets for one Greek tanker

In job order manufacturing we are therefore primarily interested in general - purpose machinery. General - purpose machines are bought today pretty much the way you and I buy an automobile. We have enough confidence in the reliable manufacturers that we rarely question the efficiency of the motor or the gear ratio of the transmission - instead, we buy what we can afford with consideration given to external characteristics.



*Announcing A New LOW COST Ball Bearing for You*

## LINEAR MOTIONS



THE  
COMMERCIAL  
GRADE  
SERIES B

## BALL BUSHING

Sliding linear motions are nearly always troublesome. Thousands of progressive engineers have solved this problem by application of the Precision Series A Ball Bushing.

The low-cost Commercial Grade Series B bearing is now added to the Ball Bushing line and offered to original equipment manufacturers. This ball bearing has been developed for support of linear motions in competitively priced, volume produced products where super precision is not essential. Alert designers can now make tremendous improvements in their products by using Ball Bushings on guide rods, reciprocating shafts, push-pull actions, or for support of any mechanism that is moved or shifted in a straight line.

Competition is returning. Up-to-date engineering can be important to you!

**LOW FRICTION • ELIMINATE BINDING AND  
CHATTER • SOLVES SLIDING LUBRICATION PROBLEMS •  
LASTING ALIGNMENT • LOW MAINTENANCE • LONG LIFE**

NOW AVAILABLE  
for  $\frac{1}{8}$ ",  $\frac{1}{4}$ ",  $\frac{3}{8}$ " and  
1" shaft diameters. Addi-  
tional sizes to follow.  
Write for new literature  
covering both the Series A  
and Series B Ball Bushings  
and the name of our  
representative in your  
city. No obligation.

**Dept. C THOMSON INDUSTRIES, INC. MANHASSET NEW YORK**  
PROGRESSIVE MANUFACTURERS USE BALL BUSHINGS—A MAJOR IMPROVEMENT AT A MINOR COST

a sales engineer can localize his selling of general-purpose equipment to the buyer's problems. The answer is that the sales engineer must know the product of his customer. The sales engineer, too, must at least be on speaking terms with his customer's business from an overall point of view. A sales engineer who can help a buyer with application problems will always be well received and his service will pay off. In most applications where flexibility of equipment is called for, you will find that more highly skilled operators are assigned to those machines. I have in mind the depression

days of 1932 when business activity was at such a low level that it became difficult to obtain a price for the product which justified acceptance of the order. Under those conditions the energies and intelligence of the entire organization are on trial. Our costing procedure on machines which required a set-up, such as an automatic screw machine, spread the set-up time over the number of pieces of the run. For example, let's assume we have an order for 1,000 two inch studs. The piece cost of each stud included a pro-rated share of the set-up costs. Orders subsequently became so few and far between that no amount of production planning enabled us to combine lots in an economical run. It was no longer a problem of grouping orders for similar parts; we just did not have enough orders.

We were forced to look at our problem from an entirely different point of view. After an analysis of our costing procedure and our potential sales, we decided to set up a short order group. Into this group we put a turret lathe, a drill press, milling machine, a thread miller, a bench and several vises. We determined minimum runs for our automatics which required set-up time and passed the smaller lots through this short order group. The group leader was the methods man and the tool maker as well as an operator. We established time values on the basis of the order and not on the basis of piece. In one instance, an order called for twenty





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straight 1" diameter steel pins. The group leader produced these with a hack saw and a vise. In many cases he was able to devise a method which allowed him to run off an entire order in less than the previously prescribed machine set-up time.

I agree with you that this solution to our problem seems no more than just the application of good old-fashioned common sense. Keep in mind, however, that the flexibility of our general-purpose equipment allowed us to use good old-fashioned common sense.

We did not have a monopoly on ef-

ficient low quantity operation techniques during these times. I recall a small Chicago concern which developed much the same approach to the production of punchings in small lots. Again, the set-up was somewhat similar to our short order group. In addition, a variety of punch presses and the machine tools necessary to improvise forming and punching dies were provided.

Of course, the piece cost will be higher in these cases but the reduced cost of tooling or set-up time affects the higher piece cost in most every case of small lot runs.

We have discussed several additional applications of versatile or flexible general-purpose machinery for limited production runs. We know that most job shops depend for their very existence upon equipment which permits them to process orders for a wide variety of products in their line. We conclude that the sales engineer must know

feed speeds, power, cam arrangement and machineability of metals in addition to having an understanding of the application of ingenious fixtures and jigs to his product. The job shop buyer expects nothing less of the sales engineer.

Therefore, the major effect of small quantity runs on machine selection is to influence the buyer to look primarily for flexibility in the equipment under consideration.

In contrast to job shop or job order manufacturing, let's turn our attention to the effect of mass production on machine selection. You are all as fa-

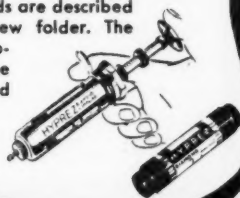
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miliar as I am with the tremendous quantities of "soup to nuts" which will run off the end of a well-integrated production line. The automobile and electric appliance industries are classic examples of this kind of manufacturing. A fundamental difference between job order manufacturing and mass production is that on the one hand you have an order or a contract for your product. In the automobile and appliance industries - mass production - you manufacture for customers whom you hope will be persuaded to take your product by your sales efforts. As you well know, Hitler

underestimated the ability of the American people to swing into mass production within the short time that was available.

Technically speaking, mass production can be obtained either from a functional layout of equipment and processes or the arrangement of equipment in operational sequence for line production. Many plants, as we do at East Springfield, use a combination of both of these schemes and if you wish, you might add that the tool room of our plant is the job order end of our business. At Springfield our functionally laid-out sections, the Punch Shop and the automatics sections, are called "Feeders."

The buyer in a plant which manufactures several similar products with a functional layout of equipment has a wider range of problems than does the buyer of equipment in a job shop.

Whereas the buyer in a job shop must choose be-

tween and among several good pieces of general-purpose equipment, the buyer for a functionally laid-out plant is continually considering the possibilities of using special-purpose equipment and dreams always of setting up his whole plant for line production.

In his deliberations, he must study the cyclical behavior of the part to be machined. He is therefore obliged to know intimately how and when the complete apparatus is sold. If his plant produces two or more similar products which have seasonally varying selling characteristics, his problem is further complicated un-

# Whatever the job

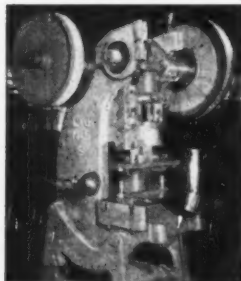
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til he determines his maximum requirements when the cycles overlap. In determining machine loads, the buyer must know the machine down time for tool changes and maintenance. The sales engineer must be able to give him this information. Will he need two or three of x-general purpose machines or will he be able to take care of his maximum requirements most economically with one special-purpose machine. A good example of the effect of overlapping cycles would be demonstrated in the tooling up for food mixers and fans. Whereas the food mixer sells more or less consistently the

year around, fans are sold only in hot weather. During the winter months, therefore, when we are stocking up fans, our machines must be scheduled for both fan and food mixer components. The buyer, therefore, is not only dependent upon sound basic planning; he is a part of that basic planning, as must be the sales engineer.

Another important fact which the buyer must consider is the stability of design of the product or products and each of their components. To know this he must be acquainted with the engineering program of his organization. He must know how exhaustively the product has been combed for cost reduction before he invests money in any kind of equipment.

Assuming that all the factors add up to a unanimous decision that a special-purpose machine is the most economical buy, the next problem of the buyer is no less

complex. His concern now is "will the new equipment require additional equipment or a method change in subsequent operations?" He must obtain all the answers to questions like these. The sales engineer who understands his equipment and the buyer's problems, can do a job of creative selling at this point.

The decision whether to use special-purpose or general-purpose equipment requires consideration of the problem of part handling. The cost of handling materials, as you know, comes high.

One of the most important advancements in the last decade in the machine

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tralized master control equipment. Permit me to add that Westinghouse has several developments along this line which will interest you.

At Westinghouse we are placing emphasis on work-loading and ejecting devices for several fundamental reasons. First of all, we are interested in reducing manual effort and fatigue to give the operator more time for point of operation inspection of quality control. Secondly, we know that dial feeds, magazines and other automatic devices keep the machines working with less downtime between cycles. We want the most out of our investment which averages approximately \$6,000 per employee. Good work-loading and ejecting devices also, at times, make it possible to allow one operator to work two or more machines.

Another feature of equipment which is demanded in our kind of mass production industries is a con-

veyorized chip removal. Visualize the tremendous quantities of metal which are taken off bars, rods, and castings daily by the hundreds of machines in a large plant working round the clock. In such plants, these quantities of chips are measured in tons and special salvage operations are necessary for economical production.

From whom does the buyer learn all these details which influence his decision regarding the piece of equipment which he ultimately purchases? We already have named the sales and engineering organizations. The others are tool de-

tool industry is the application of automatic transfer mechanisms to production equipment. Standard drilling, tapping and milling units arranged in line, or so as to present all surfaces of the particular part for machining, eliminate handling. Automatic transfer equipment is of special interest to the buyer when parts are awkward to handle. Reduction in manual effort and the simultaneous increase in hourly production result in lower piece costs and, therefore, maximum return on the investment in the equipment. Machines which are designed with automatic transfer mechanisms should include cen-



Lovejoy Type "A" milling cutters are unsurpassed for removing metal quickly, accurately and smoothly. And a big PLUS feature is blade design—H.S.S., carbide and cast alloy blades are interchangeable in any Lovejoy Type "A" housing ever built—from 4½" to 42" in diameter! No need to carry a large stock of blades because Lovejoy gives immediate delivery from its own large stock.

Another asset is Lovejoy's exclusive "positive-locking" device. This means that a minimum of stock must be removed when sharpening blades. It allows use of a large percentage of each blade. It holds blades immovably even during heavy intermittent cuts.

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signers and engineers, manufacturing engineers, quality control specialists and inspectors, time and motion-study analysts, production planners, plant layout personnel and the plant construction or works engineer. Last but not least, the buyer must consider the labor market in his area. What skills are available? Can his employment department man the equipment under consideration? Does the equipment require specialized knowledge in his maintenance department? Must his training supervisor set up a class in electronics to teach the additional skills that

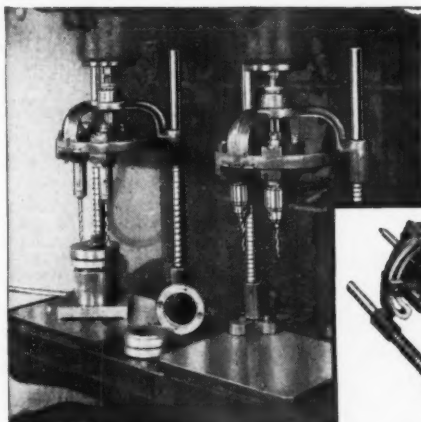
are required? Let's assume for today that he meets no internal labor resistance in getting the full production out of his equipment in this enlightened age. The functions of these specialists may vary from plant to plant but, in most well set up organizations they, like the replacement plan, do not vary fundamentally from one another.

We can see that the buyer must be a coordinator of technicians. To coordinate efficiently, he must have a working knowledge of all the specialized functions which fit together to make up the present-day manufacturing plant.

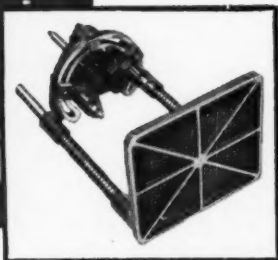
The very character of mass production industries explains the effect of quantity on machine selections. Mass production is profitable only because of the existence of mass markets. Mass markets can be obtained and expanded only by reducing costs. The most important consideration then is not

necessarily the price of the machine which is selected, nor is it flexibility as it is in a job order shop. It is primarily the price at which your machine will produce the part or product, measured in most cases today in tenths of a penny.

One of our buyers tells me that his hardest job is keeping the shop off his neck. That is a common ailment of all buyers, I assure you, and it explains why the buyer wants to know the background of your company in tooling production jobs. Is your organization customer-minded all along the line from the sales engineer to the shipping clerk? Is yours



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a company which delivers a machine and then vanishes from the face of the earth leaving the buyer with the job of justifying his purchase before the bugs are worked out of it? That word "service" can become most important to the buyer.

All these questions are in the back of a buyer's mind when he sends out his inquiries. The inquiry for new equipment may be accompanied by sample parts, drawings and general specifications. Frequently the specifications are deliberately drawn as broadly as possible to gather in a wider range of ideas. The buyer must leave no stone unturned in his effort to come through with a quo-

duct. Then there is the tool supervisor, the methods man and, at times, the foremen who will be in charge of the job.

Recently we had a problem of tooling up a ramp which is to be used on a bottled beverage cooler. We were swamped with tooling ideas. Four of our manufacturing people had different acceptable ideas and we received three additional different methods from our inquiries.

The decision was made only after a great deal of discussion with the use of comparison charts. We use comparison charts as a procedure to guide the discussion and study of the advantages

tation which he will be able to sell his organization from top to bottom and, furthermore, he must be able to live with your idea year after year. We have mentioned several times the buyer's organization and I believe we can better understand his relationship to the organization if we take a look at it.

The sales engineer in a follow-up of the inquiry is a representative of his own chief engineer. He must be able to communicate with the personnel in the buyer's organization as well as to convey that thinking to his own organization.

The sales engineer's knowledge and respect for his competitor's equipment will enable him to do a positive selling job to the varied interests in the buyer's plant.

Let's consider for a moment, who and what are the varied interests in the buyer's plant. First of all, we have the manufacturing engineer who is assigned to the pro-



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and disadvantages of the suggested methods.

I would like to point out here that the buyer in most large organizations maintains an inactive machine tool list which also must be checked before an order is placed. This list is a record of the excess equipment in his own plant as well as equipment at other locations of his company. You can readily appreciate the value of such inventory records in the re-conversion period.

In my discussion of the relationship of the buyer to his organization, I touched upon two subjects which are becom-

ing of increasing importance (if possible) to machine tool users and subsequently more important to the sales engineer. These subjects are time study and accounting.

The time study and methods engineers are some of the varied interests in today's highly organized manufacturing plants. Machine tool sales engineers will find that more and more they will be talking and selling their ideas to time study and methods engineers. I strongly recommend a study and knowledge of the fundamentals of incentive systems by all sales engineers. Without a knowledge of the basic technical language these engineers use, the sales engineer will not be able to follow fully the discussions to which he will be a party. A knowledge of the fundamentals of incentive systems will help the sales engineer follow the thinking and planning of the great majority of ma-

chine tool buyers who are working in close relationship with their organizations. Accounting is a broad subject and it is not my purpose to recommend a broad general course. I believe a sales engineer should concern himself with the kind of accounting by which a manufacturer determines his costs and factory budgets. Again, a speaking acquaintance with this kind of knowledge will broaden the sales engineer's appreciation of the buyer's thinking as well as the thinking of those persons with whom the buyer daily associates.



It has been my prime purpose in this discussion to leave with you the fundamental idea that buying is not a one-man operation. This is true, not only of machine tool buying, but it is generally true that much of the operational policy in today's business is determined through conferences and committees.

If the committee is meeting to discuss machine tools, the sales engineer and his entire organization may be represented only by the buyer. You can readily appreciate, then, the importance of presenting your sales points in a clear, concise manner. If your sales points have been properly presented and headlined, the buyer will be able to present your proposal clearly and without confusion. The buyer must have the facts in order to answer the 101 questions which he will be called upon to answer by his shop and engineering personnel who also have a stake in the final decision of machine tool purchasing.

At Westinghouse we make every effort to allow the sales engineer to represent himself and his company at these conferences. Under these circumstances, it is equally important that the sales engineer know how to discuss his proposals before a group, and, if necessary, lead

the conference.

Finally, I wish I could convey to you the urgency of doing your job with thoroughness. While this is not the place to discuss the economics of our free enterprise society, I do want to leave this point with you. The managers of industry today, more than at any time in the past, recognize the need for increased machine efficiency and technological improvements. The need has grown almost insurmountably great.

With the help, the ingenuity and the experience of the machine tool industry, I believe we can do our part to make sense out of the topsy-turvy kind of economy we live in today. End of Lecture No. 12.

**Cam Eyelet Machines** discusses automatic multiple-die machines for the straight-line quantity production of numerous articles made from thin strip metal. Method of operation, design details, parts list, special attachments, specs., are fully mentioned. 20 pages. **The Waterbury Farrell Foundry and Machine Co., Waterbury, Conn., Dept. BB.**

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## **Lecture No. 13**

### **SELLING TOOLS**

by

**B. N. Brockman**

Vice President and Sales Manager,  
The R. K. Le Blond Machine Tool Company

### **WHAT SELLING TOOLS DOES THE SUCCESSFUL SALES ENGINEER USE?**

Just as the carpenter cannot build a sound house without hammer, saw and chisel, a sales engineer must have tools to make sales. Advertising, booklets, catalogs, preprints, models, photographs, testimonials, and others, are among the tools salesmen use. These tools are important. Much money and thought is poured into them by the company. The successful salesman enlists the aid of every tool he can.

The MACHINE and TOOL BLUE BOOK is happy to present to its readers the complete lectures delivered at the Sales Refresher Course at Cornell University, July, 1948. The course was sponsored jointly by the National Machine Tool Builders' Association and the American Machine Tool Distributors' Association. While lectures deal primarily with the selling of machine tools the fundamental sales principles can be adopted profitably by the manufacturers of general industrial products. The editors thank the NMTBA, the AMTDA and Cornell University for their cooperation in making this material available to their readers.

**IT IS AXIOMATIC** that before you can sell **MACHINE TOOLS**, you need **SELLING TOOLS**. Without the proper selling equipment, you might as well be on a tour of the territory at company expense. If you do not use the proper approach to interest a prospect, and do not have the equipment with which to sell, you are like the carpenter who would attempt to build a house without saw, hammer or nails. We are builders, in a sense, for our companies. We need tools with which to build sales. Before looking at the equipment in the tool box, let's bring the carpenter allegory a little closer to home.

The man who operates an engine lathe with a high degree of skill does not develop this skill by sitting down one night to read an article from some trade magazine. It takes interest, patience, intestinal-fortitude, years of learning and teaching. It requires study, handbooks, charts, blueprints. It takes the slide rule, the calipers, and, of course, the machine tool. Those are the tools in learning, developing and perfecting knowledge and success on the job.

The man who sells machine tools must likewise have selling tools. Many of these he secures from the shop of experience - by learning - developing - perfecting.

Much of that is selling technique and has already been covered by other talks.

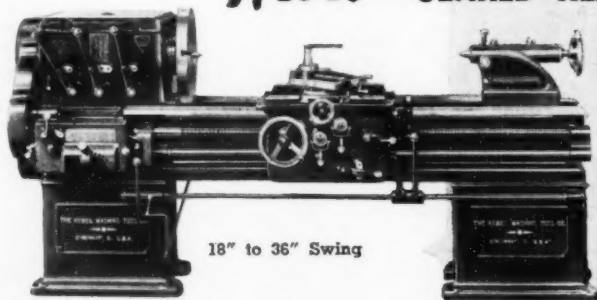
What other tools does a salesman need? Personality and a thorough understanding of his machine are but fundamentals, and hardly enough for the man who sells mechanical equipment. What determines the placing of an order is not what he knows, but how much of what he knows he can instill into the customer's mind. If he is to secure his customer's interest - and hold it - long enough to transmit what he knows, he must be properly equipped.

He needs samples. He needs models, photographs, the ability to make a simple sketch. He needs catalogs, circulars, booklets. He needs advertising, preprints, direct mail, performance records, testimonial letters, and sometimes slides, movies, or maybe television.

Preparedness counts. A simple fact or figure about the product or its use can often swing the balance of the sale in your favor. Plant interviews pay off in extra sales. No facts - no figures - no sales.

This list isn't all-inclusive. It isn't intended to be. All sales engineers and all companies do not need all of these tools. On the other hand, some need all and use even more. It depends upon the size of

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the company, what it has to sell, what it can afford to spend and a number of other factors about which you are as well informed as I am.

The fact of the matter is that the sales engineer is one of the most neglected men in the world. Too often he is left to his own devices; too often he has to manufacture his own selling technique. Much of the information which he could use to good advantage, he never receives. Some of the aids he does have, he does not know how to use. By way of helping this unrecognized hero of American Industry, let's put the microscope on some of the most important of these selling tools.

Samples: for certain types of machines, for example, an automatic bar machine, samples are very effective. The sales engineer should know who made it, in what factory, of what material, and in what time, as well as how the part is used, what is fussy about it, etc. Remember, many of your customers absorb information more quickly and easily through their eyes and fingers than through their ears. If one of them has a similar part to make which is taking him longer, you have started something.

Models: a small-scale model of a machine that can be put on the customer's

desk is far better than photographs. It is surprising that this selling tool is so little used. We are all kids at heart; we can't resist a model. Your worst problem will be to get it away from the customer. Such a model may be of painted wood; it need not be operable.

Photographs: many sales engineers find a photograph album an excellent selling tool. The photographs must be carefully taken to bring out just what he is going to say, and never retouched.

The sales engineer must know the album by heart; he must never fumble in finding the photograph he wants. The customer is not distracted by any printing; he looks at the photograph while the sales engineer makes his points. It is absolutely essential that, if a question is asked, the sales engineer answer it fully, then go back without confusion to his sales talk, picking up where he stopped. Yet the machine tool purchaser does not like a canned talk or memorized speeches. You must keep in your mind a clear sequence of selling points.

A slide film is a photograph album in a different form. It is better when you must talk to more than one prospect. I'll say more about that presently.

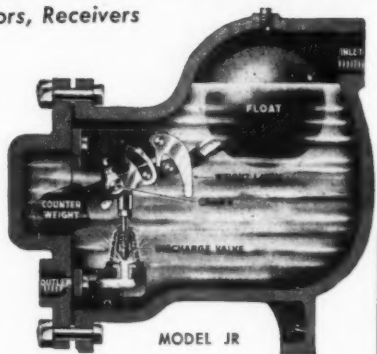
Sketches: the simplest selling tool of all is very much neglected — free-hand

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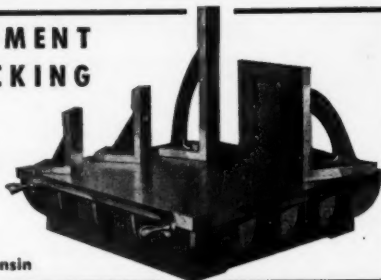
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ENGINEERS AND MACHINISTS SINCE 1907

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sketches. They may be crude; you're no artist, but when you are making a sketch your prospect's eye will be right on that pencil. Learn to draw it his side up. In many cases you can bring out a detail of a tool, of a fixture, or a machine, more effectively than in any other way. Remember that you are talking to a man who uses sketches and drawings all day long in his business.

Catalog: the most useful tool we have in our sales department is the general catalog which outlines practically all of the machines which we build. As a rule, catalogs are the rustiest, the saddest and the most abused medium of information. All you have to do around our plant is to mention the word catalog and you will bring the house down on your shoulders. At least that was the condition until we revised our own four years ago.

Catalogs deal with cut-and-dried facts. Due to constant engineering changes, which we must continually make, they are extremely difficult to keep up to date. If the creator of the catalog lacks enthusiasm for the job, nine times out of ten you are in trouble, because the advertiser himself does not appreciate the real function of the catalog. The advertising department's budget is often too low to allow for any decided improve-

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No. 38

### THROATLESS BENCH SHEAR

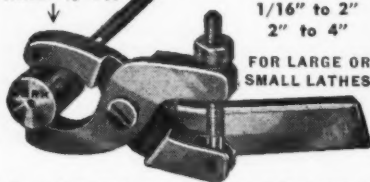
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6 Sizes  
Priced To Sell



## ARE YOU COMPETING AGAINST ? TOOL PERFORMANCE LIKE THIS ?

**Staples Carbide-Tipped, Shell Type Expansion Reamer**

(Patented)

**REAMED 112,175 CAST  
IRON PULLEY SHAFT HOLES  
OVER PERIOD OF 1½  
YEARS — WITHOUT RE-  
PLACEMENT — EXPANDED  
ONLY!\***

This Staples Carbide-Tipped Shell Type Expansion Reamer has an unusually wide variety of applications. Tool is expanded by driving shell up tapered arbor. Uniform parallel expansion the full flute length is maintained, permitting easy adjustment to .0001". As the shell is a standard item, a new tool is obtained simply by replacing the worn shell.

Many design variations of this tool are possible, including use of two shells of different diameters for step reaming. If you are interested in obtaining maximum economy from your reaming operations, by all means investigate this outstanding Staples development.

\* Actual tool performance report on turret lathe operation submitted by a large midwest manufacturer.

**THE STAPLES TOOL CO., Cincinnati 25, Ohio**

Distributors in Major Cities

**Staples**

Complete tool catalog sent on request.

**CARBIDE-TIPPED CUTTING TOOLS**

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING TOOLS  
EXPANSION REAMERS • FORM TOOLS • CENTERS • MASONRY DRILLS  
• SPECIAL TOOLS

ment. Most of you know that it is a very expensive item and the result is that the authors feel a little frustrated about the whole thing. At least this is the impression one gets after appraising the legion of catalogs I have thumbed through in the past few years.

If the catalog is not prepared as it should be, if the facts therein are presented with all the effervescence of a glass of flat beer, if sales engineers are not instructed in its use, the company will get only a small percentage of the good out of it that it would have received had the catalog been properly pre-

pared in its creative stages. The common denominator of any catalog can be reduced to this question — "does it sell?"

We feel that the chief considerations in building up the preparation of the catalog should include the following basic points. Does it induce direct sales? Does it supply the information and technical data that prospects and customers want and need? Is it applicable as a handy sales tool for the salesman? Literature which succeeds in doing these three things, no matter what the size shape or color, is appreciated by your prospect, the sales engineer and the company whom you are trying to sell.

We are continually on the look-out for essentials which we think customers would like to see in our catalogs and try to employ them to their utmost advantage.

High among the priorities are illustrations of our products, plus a complete description and information on the use of the product. Feature those parts of your equipment which make for important selling points. While we do not show installations of our equipment on the job in our master catalog, some firms use them to advantage. What we try to feature are the more important selling points, and above all, the dimensions in full detail. Do not be afraid to put SELL into the copy, which will otherwise be dull and uninteresting.

Specifications are an important point in selection. People do not page through catalogs out of curiosity. They are look-



# THE CAMPBELL THAT CUTS THE COST OF CUTTING

Wheel Guides  
Separate Coolant Tank  
Five Inch Wheel Flange  
Automatic Work Stop  
Automatic Coolant  
Pump Operation  
Instantaneous  
Electro-Hydraulic  
Automatic  
Work Clamp



DH-30

MODEL 223

ACCO

CAMPBELL MACHINE DIVISION  
AMERICAN CHAIN & CABLE

937 Connecticut Avenue, Bridgeport 2, Conn.

CAMPBELL  
Abrasive Cutters  
and Nibbling Machines

● For every cutting operation, there is one most economical method.

For many cutting operations, this is it.

It's the new CAMPBELL MODEL 223 WET ABRASIVE CUTTING MACHINE. It is the machine especially developed for faster cutting, easier operation, longer wheel life and . . .

## LOWER FIRST COST

It is the most widely useful Campbell Abrasive Cutter ever built.

We suggest you send for BULLETIN DH-30 that gives you complete information.

successful catalog has these important factors so far as overall design is concerned:

(1) **Identification:** Does your front cover quickly identify the products and the manufacturer? We do that very well on our catalog by using the phrase "LeBlond Lathes Turn the World Over."

(2) **Index:** If the catalog covers various products, are they easily found? We have an index, and also have our sizes following in sequence.

(3) **Organization:** Is the catalog divided into sections which are easily identified?

(4) **Visual Flow:** Is the catalog easy to read? Is it interesting? Are the pictures, charts, diagrams and copy tied up in a pleasing arrangement?

(5) **Content:** Is it information presented and developed in such a manner that prospects can make their own selection with ease?

(6) **Action:** Does the catalog impel the reader to select and buy?

ing for something; want to know all about it, including the size, weight, capacity or what have you.

Our present catalog is a decided departure from any previous issue. It may seem unimportant to many of you, but the comments we have received on the set-up are proof enough as to its practicability. It is one of the heavy items of our advertising budget and every reprint involves changes which are costly and require a great degree of patience in preparation.

Sweet's probably know more about the catalog business than anyone else. From their experience they know that a suc-

I believe this is as good an outline as you will find anywhere. If you follow it in detail, you will develop a catalog that's a tool that you can be proud of, one that can be used with profit, and one that your prospects can read with interest.

Catalogs, like salesmen, need to revise their selling tactics periodically. To put it bluntly, overhaul it for selling effect. The appearance and dress of the salesman is hardly more important than the appearance and dress of his printed contemporary. The catalog that appeals to the eye will in all probability, get more at-



# Is METAL PARTS CLEANING a bottleneck in your plant?

## DEGREASERS



## WASHERS



## DRYERS



Distributors of  
**MIDSOLV**—a Perchlorethylene  
Degreaser Solvent  
**TRICLENE D**—a Trichlorethyl-  
ene Degreaser Solvent

Complete line of **OPTIMUS** Equipment in standard and special sizes to meet every metal parts cleaning problem and allied processing application.

**OPTIMUS VAPOR DEGREASERS**—vapor, vapor-spray, liquid-vapor and combinations. All sizes—simple batch type to custom-built monorail or cross rod conveyor models.

**OPTIMUS METAL PARTS WASHERS**—single or multiple stage—screw or conveyor, mesh belt or monorail types.

**OPTIMUS DRYERS**—specially designed system of directional air jets assures spotless drying.

Submit your metal parts cleaning problem to our engineering staff.

Send for  
Complete Catalog  
and additional  
information.

**OPTIMUS EQUIPMENT CO.**

29 Water Street Matawan, N. J.

Offices in principal cities

# OPTIMUS® EQUIPMENT

FOR CLEANING • RINSING • DEGREASING • PICKLING AND DRYING OF METAL PARTS

tention than one that doesn't. On the other hand, we do not deny that a salesman or a catalog that doesn't look smart won't bring in the orders, because after all, it is information that the buyer looks for and the snappier you can give him this information, the more confidence he will have in you.

I said a catalog should look smart. It should also be sharp. It works day in and day out. It is a tool which works even when the salesman is not in the prospect's office to back up his arguments. Its selling message is the same day after day, and, day after day, it bucks the

competition of other catalogs. Make it stand on its own merits. Arrange it to make a favorable first impression and, if you do, you will continue to impress the prospect throughout the book. Many companies are still distributing, direct to the prospect or through their distributor's organizations, catalogs that are seedy in general appearance. Yes — the cover may have changed. There may be a few cuts of new products. The type may have been reset with a more modern face but its general appearance still lacks the quality which we all strive to build into our product. If the catalog is well disposed to meeting prospects without the help of a salesman, it will surely put him in a better light when he does make the personal contact. Good catalogs can make the sales engineer's time more productive because prospects, conditioned by catalogs, are closer to decision

and do not need the usual warming-up period. One can get down to the actual closing of the business with a minimum of discussion, and concentrate on recommendations, price, and specific proposals, if the advertising material in correct form, has paved the way. As your catalog performs, so will your sales engineer.

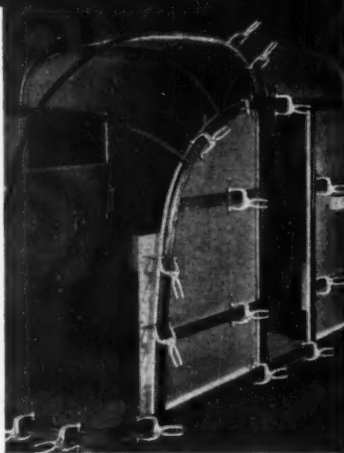
Circulars: all of you, I know, feel that your circulars are the last word. These "assists" come in for a great deal of scrutiny, particularly when attached to your proposals, where it is not feasible to send the entire catalog. After the buyer

## DESIGNED FOR DE-STA-CO PORTABLE TOGGLE CLAMPS

This progressive trailer coach manufacturer designed his frame of square tubing for line assembly by welding. It takes pressure to draw formed tubing together for welding — it takes fast action to keep handling costs low — it takes De-Sta-Co Portable Plier clamps to meet all the qualifications this rapid production demands. You, too, can rely on their quick, positive toggle lock and release, their ample clamping pressure and easy adjustment to varying thicknesses and their wide, deep jaws for your bulky, awkward jobs.

These NEW De-Sta-Co Portable Clamps are machined forgings with deep-section jaws and grips. Bearing pins are long-wearing stainless steel. Models 468 and 474 are available with spring compensating or screw adjustment.

Write for folder describing Portable Toggle Clamps or our general catalog No. 47.



Portable Clamp Uses:

Assembly of

- Sheet metal ducts, cabinets, furnaces . . .
- Aircraft frames and skins . . .

- Truck and auto bodies . . .
- Wood and plastic laminations . . .

For drilling, welding, riveting, cementing . . .



## DETROIT STAMPING COMPANY

347 Midland Ave., Detroit 3, Mich.

has interviewed all of the competitors, after he has received the various quotations, when generalities are cast aside, and the committee on purchase gets down to picking the successful bidder, the circular is often the deciding factor. It must, therefore, tell him at a glance what he will get when he buys. Will your offering give him the capacity he has in mind? The degree of accuracy he requires?

Our circulars are planned with these requirements in mind. Into each of them we try to pack as much printed salesmanship as possible. We try to point out,

for the convenience of the buyer, our every advantage, and we detail these advantages, even to the floor space required. This is important to him as well as to our distributor organization. Our circulars are of every color. This is not an accident, but is necessitated by our varied line, particularly where standard lathes are concerned. In general, our distributor organization cannot handle a complete catalog and descriptive matter of all of the machines we build, so to lighten this load, these individual circulars seem to be the answer.

While we expect the sales engineer to be thorough in discussing our products in their entirety, half of the time his calls are devoted to a specific machine inquiry which can be readily and effectively handled by a circular. It is regrettable, but true, that the average distributor, where a multiplicity of lines are

handled, cannot be as thorough as the direct sales force, and by the same token you must condense your information for the distributors' men and do it effectively.

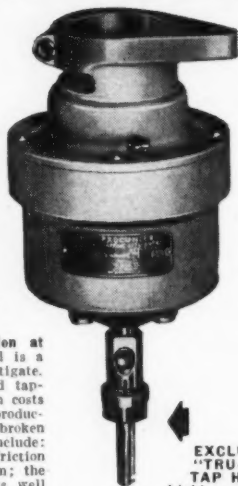
Booklets: last year we tried something which became one of the most important sales tools we have ever furnished our field men. It was a transvision portrayal of our Dual Drive Lathe. We dubbed it "The Silent Salesman," because we were egotistic enough to believe that with this booklet the machine would sell itself. Perhaps you have seen it. It is a three-dimensional transparency in

## HERE IS PRODUCTION NEWS!

Now you can  
**LOWER  
TAPPING  
COSTS**  
while maintaining  
**TAPPING  
PRECISION**

If your problem is precision production at lowest cost—this Procunier tapping head is a production tool it will pay you to investigate. For over 30 years Procunier high speed tapping heads have been keeping production costs down . . . turning out faster precision production tapping with less spoilage, fewer broken taps. Exclusive Procunier features include: the sensitive Procunier double-cone friction clutch; the heat treated gear mechanism; the ball bearings for continued accuracy; as well as many others. Before you order any production tapping equipment . . . get the details on Procunier — the tapping heads that deliver quality tapping at lower cost!

**Procunier**  
**Safety Chuck Company**  
**14 S. Clinton St.**  
**Chicago 6, Ill.**



**EXCLUSIVE!**  
**"TRU-GRIP"**  
**TAP HOLDER**  
Lighter, smaller, it  
affords easier tap-  
ping close to walls  
or shoulders, elimi-  
nates "chewed up"  
tap shanks.

**HELPFUL DATA FILE**  
on tapping and threading ap-  
plications is yours for the  
asking. Just mail the coupon  
today.

### SEND FOR CIRCULAR

PROCUNIER SAFETY CHUCK CO.  
14 S. Clinton St., Chicago 6, Ill.

Gentlemen:

Please send your illustrated brochures which give complete prices and specifications on Procunier High Speed Tapping Heads and Machines.

Name .....

Address .....

City ..... Zone ..... State .....

five colors. We used it to introduce our first post-war lathe. It was expensive to produce, but it was selected as the one and only satisfactory method of graphically presenting the revolutionary design and construction of the new dual-driving headstock. The machine itself was a trial balloon; so was the "Silent Salesman." It was regarded as even better, and considerably less expensive than a demonstration model machine and certainly could be given wider distribution.

At the time, the "Silent Salesman" had the added benefit of being an almost new medium. The technique of printing

on acetate is not new but its high cost prevents it from being used generally. So far as we know, we were the first members of the machine tool industry to employ this form of promotion. By providing our sales force with this unique booklet, we think we have given them one of the most modern of sales tools.

The results were entirely satisfactory and after all that is the meat of any radical departure from the normal. Engineers who have seen this book, say it is more revealing than motion pictures, photographs, charts, blueprints, or any combination of these media. This technique virtually X - rays the lathe in three dimensions and thereby presents a much sharper conception of lathe design, construction and maintenance, than ever possible before. We did make one mistake; that of not having it printed in a larger size.

With this book on his desk, it is possible for the lathe buyer to examine the construction details inside and out. He can disassemble and assemble the machine piece by piece as it were, merely by turning the pages, and before he knows it, the prospect has helped to sell himself. Like anything else, the novelty wears off, but the "Silent Salesman" still performs many functions in addition to direct selling and self-selling. It is being used as a textbook in many schools under the title of "Visual Demonstrator." As an interesting sidelight, the U. S. Marine Corps ordered a thousand copies bound in special covers bearing the

# "ROTO STRAINER" SAVES FILLING TIME

with  
**H & K  
PERFORATED  
METALS**

How to remove dirt, skins and foreign materials from paint without violent agitation or danger of separating and displacing the necessary ingredients. H & K Perforated Metals fill the bill here, too. Paint manufacturers who use the "Roto Strainer", containing an H & K perforated copper drum, find it saves them from 30% to 50% in can filling time.

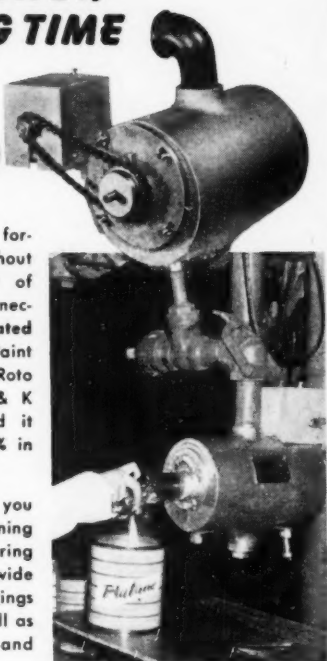
"H & K Perforated" can help you with your screening and straining problems, too. An inquiry will bring you full information on the wide range of sizes, shapes and spacings in nearly every metal...as well as in plastics, fabrikoids, plywood and other sheet materials.

Write for  
literature

"Roto Strainer" (The Rotospray Mfg. Co., Chicago) strains up to 850 gallons of paint per hour.

**The  
Harrington & King  
PERFORATING CO.**

5635 Fillmore St. Chicago 44, Ill.  
114 Liberty St., New York 6, N. Y.



that it was his job to determine which steps can be efficiently and economically performed by our equipment so as to increase the productivity of the skilled workmen. We do this day in and day out with the result that we come up with a lower unit production cost, increased production, and therefore, greater profits.

Now let's suppose you apply this same approach to an analysis of your selling process. Don't forget you are never through selling a customer. You discover which steps can be most efficiently and economically performed by the high-speed low-cost tool of advertising. Why? To increase the productivity of the skilled workman in the field — the sales engineer. Advertising performs the preliminary steps in the manufacturing of an order. It permits a sales engineer to concentrate his limited time on the job that he alone can do best, namely,

that of closing the sale. The result — lower unit selling cost — increased sales — greater profits.

It is generally understood that there are five basic steps in the manufacturing of an order; namely, contact, interest, preference, application, and the order itself. All salesmen take these five steps. A great deal of time, however, is lost on contact, interest and preference, with the result that they have very little time for the specific proposal and the actual order. Here is where advertising steps into the picture as a useful and economical tool. We all spend money for advertising

Marine Corps insignia, solely for educational use. When they were still a novelty, we did very well selling these at a dollar per copy, but were criticized roundly for our attempts to enter the publishing business. Frankly, we sold a lot of machines on the basis of this booklet but the cost is too high to allow its use when a number of different designs are involved.

Advertising: one of our sales engineers told me recently that he felt that there was not much difference between manufacturing a product and manufacturing an order. He worked on the theory

# MAGNA-LOCK "SUPREME" THE ULTRA-POWERFUL LAMINATED MAGNETIC CHUCK

by HANCHETT



NOW NEW APPLICATIONS  
of instant Magnetic Chucking  
are possible — for milling,  
grinding, shaping, drilling,  
planning—

- Laminated construction has 22% more magnetic surface—to the extreme edge.
- Holds the tough jobs—large or small.
- Special surface contours available for special jobs . . . custom design to fill your needs.
- Simplicity in operation—rectifiers and demagnetizers available.

ANOTHER HANCHETT  
FIRST realized because of a  
necessity and backed by a  
precision machine tool build-  
ers' experience.



Check your shop today—for operations where  
chucking time cuts into profits. Let us recommend  
Hanchett Laminated Magnetic chucks to cut op-  
eration time in machining any of your parts.  
Ask for bulletin MT-39.

Hanchett

## MAGNA-LOCK CORP.

Magnetic Chucks and Devices  
BIG RAPIDS, MICHIGAN, U. S. A.

primarily because we realize that adver-  
tising will accomplish something more  
quickly and effectively than could be  
achieved by any number of salesmen.

Advertising is a tool — a selling tool  
and a low-cost tool. Well used, it capably  
accomplishes the first three of the five  
steps to the building of the order; that  
is contact, interest and preference. If  
handled properly, it frees the salesman  
so that he can concentrate on the vitally-  
important steps, application, and on the  
order itself, which can only be secured  
by personal contact.

The sales engineer is, or should be, a

highly-skilled special-  
ist. His time is  
limited because his  
time is valuable.  
His particular job  
is to provide the  
"personal touch"  
between his firm  
and the prospect.  
He must act as an  
ambassador of  
good-will by meet-  
ing and overcoming  
specific selling ob-  
stacles; and also  
apply the product  
to specific needs  
and problems. Fi-  
nally, by closing  
the order.

Advertising is  
not intended to  
take the place of  
the sales engineer,  
nor can the sales  
engineer take the  
place of advertis-  
ing in present-day  
selling. To me, ad-  
vertising is the  
man who can make  
hundreds of calls  
simultaneously and  
who can contact  
thousands of pros-  
pects, cheaply,  
quickly, and at reg-  
ular intervals. It  
is a known fact  
that the most suc-  
cessful industrial  
marketers are  
those who use both  
sales engineers and  
sales promotion in  
the proper propor-  
tion. The proper  
proportions are de-  
pendent upon the

product, the methods  
used by the com-  
petitors, the size of  
the company, and  
other factors.

These are only a few, but a mighty im-  
portant few, of the benefits I think can  
be derived from the fertile field of adver-  
tising. Again it reaches all of the buying  
influences including those hard to con-  
tact; maintains friendly relations between  
calls; and, finally, paves the way for an  
effective interview. I would agree that  
personal selling accounts for 98% of the  
equipment and materials ordered, but it  
is the extra 2% of the advertising and  
other means of sales promotion that pro-

# Emboss Your Own Metal Tags

*At Low Cost*



**Get a Completely  
Embossed Tag Every 1½ Seconds!**

You can emboss up to 20 characters at a time on 50 metal tags per minute with this efficient, easily-operated Pannier "Master Marker." Characters are carried on interchangeable slides; positioned by hand wheels on side of machine head. Die slides are engraved to specification, including standard code characters of the Concrete Reinforcing Steel Institute. Tags are supplied in reels; mount on machine for safe, convenient feeding. Machine is available with foot or power operation.

## GET COMPLETE DATA FREE

Complete data on this and other efficient Pannier "Master Marker" Embossing Machines is available on request. Ask for Bulletin D-9.

### OFFICES:

Pittsburgh, Pa. Chicago, Ill. Los Angeles, Calif.  
Youngstown, O. Philadelphia, Pa.



## THE PANNIER CORPORATION

203 Pannier Building  
Pittsburgh 12, Pa.

vides the spark to keep the engine running smoothly.

I need hardly add that advertising is not a useful tool for the sales engineer unless it is the right kind of advertising. Advertisements should be sales talks in print. If you could talk to the President of International Harvester Company for five uninterrupted minutes, what would you say about your machine tool? All right — that's your ad. For, by means of it, you are talking to him and thousands of other top-ranking executives.

Direct Mail:

Direct mail selling, or direct mail ad-

vertising, or direct mail propaganda, seems to have quite a field in our industry. The direct mail medium seldom sells on its own strength. Its proper use is not to complete the sale but rather to support the means by which new and repeat business is obtained, that is, personal selling.

Direct mail has many functions and sometimes it can do amazing things, some good and some bad. It has advantages and disadvantages. There are right and wrong ways of handling it. There are also right and wrong times for using it. Some advertisers have little faith in it; others oversell it. In my opinion, there is a place for direct mail in every concern for every product. Resulting failures may be due to timing, the mailing list, and the very mailing piece itself.

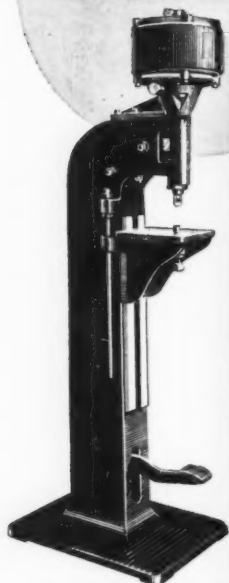
As for an example of timing, to start a campaign immediately before or during the Holiday Season

would prove disastrous as far as results are concerned. To have your mailing piece reach your customer's desk on Monday when his mail is already heavy, is equally unfortunate. These are little things, you say; almost anyone would take these into consideration. Yet there are many who do not, and you can check this by the advertising material that comes over your own desks.

Mailing lists cannot be cultivated too much. It is wise to build up a mailing list over a period of years. It is a lot wiser to keep it up to date. Make every mailing count. If you buy a list for a campaign,



# LINLEY



## SEND SAMPLES

We will gladly rivet sample parts and return them for your inspection.

1 LN 49

## WHERE RIVETING "KNOW-HOW" COUNTS

The practical knowledge that has solved many an "impossible" riveting problem is built right into Linley Riveting Machines. Designed to maintain accuracy and quality of work under hardest conditions. Rotary spinning principle shapes heads noiselessly... capacities to  $\frac{3}{8}$ " diameter. Adjustable spindle stroke, controlled pressure... thrust bearing supports spindle, carries load. Eight models. Bring our experience into your plant and make your tough jobs easy.

## LINLEY BROTHERS CO.

673 STATE ST., EXTENSION  
BRIDGEPORT 1, CONNECTICUT

one who can use it to his advantage and to your own as well.

What should go into the mailing piece? If it is a catalog, you already have the answer. If it is about a particular machine or other equipment, follow the same procedure. In other words, tell the whole story. Tell all to sell all. Do it directly. Do it handsomely. Do it in an interesting way, and do it briefly. Tell them how to act; and tell them to act. A mailing piece that tells a good story and gets the prospect sold, and then neglects to encourage him to act, misses the main point. At no time be afraid to ask for the order. Direct mail advertising is not meant to supplant regular business paper advertising. Some things it can do better than the business paper advertisements; and vice versa. The big advantage of direct mail is that it gets individual attention. It has more

news value. It can talk about a subject at length, thus giving time for the prospect to consider.

make sure it is the list you want; that is, that it does have on it the people you want to reach. Shotgun mailings are not good, as you probably know. You want to peg every prospective customer down as to the area, industry, and person you want to reach. This is a tough job, particularly since the war, because of the numerous changes in personnel. Many of the distributors do a splendid job of keeping us up to date. If this is really handled correctly, the results do pay off. A selling tool is absolutely worthless if it gets into the hands of someone who cannot use it, or if it does not reach the

news value. It can talk about a subject at length, thus giving time for the prospect to consider.

Advertising is a shot-gun. Direct mail is a rifle; it can be more accurately aimed.

One disadvantage of direct mail is that some recipients regard it as cheap publicity. Another, that it is impossible to include all of the executives who influence buying. To them, business paper advertising may carry more authority and weight. The direct mail piece is seldom routed to others and it suffers the additional disadvantage that it cannot meet or answer objections which may arise.





## GUN TYPE SAW



At last, a saw which cuts anything, stainless steel, rubber, wood, aluminum, etc. Blade has a variable speed which is set in 45 seconds. . . the stroke length of the blade is adjustable from 0 to 2", depending on thickness of mate-

rial. Transa has twice the power on the cutting stroke due to a special gearing arrangement. Special guides for each width of saw blade, 1/2" to 1", eliminate whipping, turning or cracking the blade, and acts as a cutting guide at the same time. Transa guns are used extensively in machine shops, assembly plants, fabricating industries, repair, installation and shipping departments.

Write for free bulletin.

# TRANSA INC.

440-45 Gateway Bldg.  
Minneapolis, Minnesota

These are a few of the arguments, pro and con. I do not think it necessary to pursue them here, since we are primarily concerned with direct mail as a sales tool. I would like, however, to add a case history illustrating the hidden potential of direct mail. This actually happened in our shop.

We had manufactured a special-purpose machine for some years but did not put much publicity behind it because its potential market seemed limited. We developed the machine during a time when we needed business. We did not push it too hard in the plant or in the field for al-

most ten years. About a year ago, more out of curiosity than anything else, although we are always looking for business, we resurrected this job. The Advertising Department was given the "Go" signal to promote it by a simple, low-cost, direct mail piece and a follow-up bulletin after rather intensive research. If I could tell you the number of inquiries we have received on this job, and the activity on the machine caused wholly by this direct mail campaign, I know that you would be amazed.

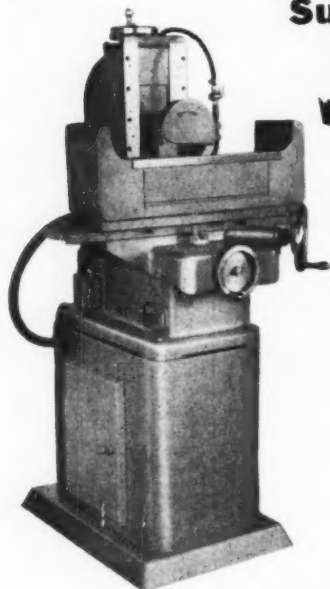
Direct mail was selected as the medium because it was considered to be the most direct, the most efficient and the least expensive. It was felt that applications for this type of machine were very limited and that business paper advertising, or any other medium, would involve too much waste. However the metal-working and printing industry publications used much

of the publicity material we sent them, and several inquiries resulted from this. The campaign consisted of two mailings, each sent to about five thousand printers, publishers and paper mills, largely foreign to the ordinary calls of the machine tool sales engineer. Inquiries were received not only for the size of machine promoted, but they led to the consideration in some cases of more expensive machines. Close cooperation and quick follow-up by the sales organization, helped to make this direct mail campaign a very effective sales procedure. It also provided valuable market research data which proved that

**FAST - ACCURATE - ECONOMICAL!**

*that's the* **EXCEL No. 7**

**Surface Grinder**



PRICE

**\$595.00**

LESS MOTOR AND  
PEDESTAL F.O.B.  
BENTON HARBOR

Built to accurately grind tools, dies, chip breakers and for all round tool-room work, the sturdy No. 7 is also capable of handling many production jobs, freeing larger grinders for other work. You'll find this low priced grinder a really profitable investment.

Built-in COOLANT attachment extra.

Working surface .....  $5\frac{5}{8}'' \times 10\frac{3}{8}''$   
Longitudinal travel ..... 12"  
Cross travel .....  $6\frac{1}{8}''$   
Height under 7" wheel..... 9"

Write Dept. MT-39 for free literature and name of nearest dealer.

DESIGNED AND MANUFACTURED BY

**COVEL MANUFACTURING COMPANY**  
**BENTON HARBOR • MICHIGAN**

the potential was considerably greater than we thought. Being satisfied with the initial effort, we are continuing the program with direct mail and limited business paper advertising. Any direct mail piece must be followed up with additional promotion to make it effective.

Performance Records:—performance records are the very heart of effective selling and advertising. Nothing is so reassuring to a works manager, who faces the responsibility for spending his company's money for a new machine, than the story of how another works manager did the same thing and succeeded in cut-

ting his cost.

Testimonial Letters:—you customer will write a testimonial letter because he wants people to know how progressive he is. You can have it reproduced so that each copy looks like an original letter. These are splendid for direct mail, enclosure with quotations, and sales interviews.

Reprints of effective articles in trade papers should be similarly distributed. Your customer gets a ton of magazines a month; he may have missed your story.

Portfolio: — another use of advertising, in addition to its job in the trade magazines, is that its messages, when used as preprints, can make up the bulk of the sales news portfolio sent monthly to all sales engineers and all sales organizations. Within the past year, we have adopted this procedure with quite a degree of success. We didn't originate this idea, of course, but I do believe that our

method gets a little more attention than the ordinary form letters sent out monthly by many machine tool builders.

This portfolio has many uses. It contains a wealth of information and about everything the sales engineer needs to back up his sales talks. It usually contains preprints and reprints, schedules, sales news, sales plans, engineering and technical developments. In short, everything of interest to the men in the field. Everything to help make productive salesmen more productive.

Personally, I prefer preprints of ads over reprints. Reprints are old stuff.

Many prospects have already seen them. Preprints, on the other hand, are new; they are stimulators, not only to the sales engineer but to the prospect as well. They can be used as opening wedges to a discussion. You can send one or two of them to a customer along with a letter. One of our distributors does this very effectively. This portfolio, which we call the LeBlond Sales News and Advertising, goes to both domestic and overseas distributors. It effectively replaces the vast volume of the spur-of-the-moment circular letters with which distributor organizations and sales engineers are normally plagued, and it brings news of interest to men in the field in one complete package.

Through the Sales News, distributors are given a preview of advertisements to appear in business papers during the next month. We encourage the distributor to order company-sponsored helps and to suggest further promotion methods. It also keeps them abreast of any news involving our products. Response to the Sales News from the field indicates that it is serving a long-felt need by maintaining regular communication with the company's independent distributor organizations, and it does stimulate enthusiasm for LeBlond's entire line.

**Slide Film:**—an economical slide film might be a good trial balloon. Many sales training subjects, topics of statistical or graphic nature can be presented very effectively with slides. As a matter of fact, we recently used the slide system in demonstrating some of our equipment to a large manufacturer in Detroit, and the interest in these pictures was astonishing. In this particular case the equipment had been installed and the purpose was merely to show the operating personnel all of the features and the possible advantages that they could secure by correct operation. At the meeting we reached about thirty-five individuals whom we could have never reached in such a short space of time.

**Movies:**—another very important selling tool is motion pictures. Movies and talkies continue to have tremendous appeal. No other medium can pack into it the drama, the logical thought, or illustrate the features of a product as well. It can sugar-coat facts and ordinarily dull details in such a way as to make them an integral part of a complete and interesting story. There is no better medium for opening up the mind without effort and slipping in the sales message. So far, I have not been able to "sell" our company because of the time involved and the scope of our operations. To de-

## (PRODUCTIMETERS) *Count Everything*



Productimeters installed on your machines at production, assembly or points of shipping insure an accurate count on every operation.

Send for  
Catalog  
No. 100

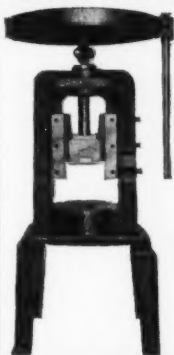
**DURANT MFG. COMPANY**  
1928 N. Buffum St. 128 Orange St.  
Milwaukee 1, Wis. Providence 3, R. I.  
Representatives in Principal Cities

## PRODUCTIMETERS

SINCE 1879

*Speedometers of INDUSTRY*

## 17" Garrigus SCREW PRESS



The 17" Garrigus Screw Press was designed to meet a diversified line of usage such as is required in machine shops and tool rooms.

Notice:—The full 17" clearance in width between the frame pillars.

The 4"x6" openings in the pillars for bar straightening.

Rugged and neat appearing double braced legs.

The large lead screw.

The nicely balanced hand wheel with adjustable handle for easy operation.

Weight of wheel, approximately 400 lbs.

Total weight of Press with equipment 2320 lbs.

Maximum over all height of press 7'

Also Builders of

Hand Milling Machines

Rotary Surface Grinders

And Special Machinery

## C. G. GARRIGUS CO.

HADDAM, CONN.

## Estimate Fast, Accurately, with Machine Operation Times

### FOR ESTIMATORS

By Joseph C. Derse



**READY-MADE DATA**, tables, methods for building up quick, reliable estimates of machine operation times **without need for taking special time studies!** Gives times for each operation on principal metal-working machines. Shows how to use data; analyze drawings to determine most economical operations; list steps in each machine's cycle; diagram tool setups; select proper feeds, speeds; make allowances in final estimates. 82 illustrations.

**\$6.00**

**SENT ON 5 DAYS' APPROVAL**

Order  
Now!

**SEND ME Machine Operation Times, Derse, \$6. I will remit or return book within 5 days.**

Name .....

M-497

Address .....

City ..... State .....

**THE RONALD PRESS COMPANY**

15 East 26th Street, New York 10, N. Y.

## MOTOR MICA

TRADE MARK REG. U. S. PAT. OFF.

### COOLING

### ANTI-FRICTION COMPOUND

In White Powdered Form



**SERVING INDUSTRY FOR 35 YEARS**

- Cools hot bearings
- Solves toughest lubricating problems
- Saves wear on moving parts
- Works wonders with cutting oils
- Packed in 5-10-25-50-100 lb. containers.

**Write for Free Sample.**

**SCIENTIFIC LUBRICANTS CO.**

3469 N. Clark St. Chicago 13, Ill.

pict our line in the way it should be portrayed with cost in the neighborhood of thirty thousand dollars. It is difficult to single out one particular machine from our line because all of the LeBlond lathes are popular. I know you will pardon this sales plug.

A movie can be your very best sales story and there is always one best way to say a thing, every time you run it off.

Aside from our company's policy, the popularity of the 16 mm movie in the armed services encouraged their adoption by various industries since the war. A number of you are now using movies. Their use has become so important and so widespread that they must be considered seriously. They have proven their worth in the short time they have been used by industry and sales-minded men who look to the future are finding in the movie the tool they need to meet prospects' demands for the complete story without any waste of time.

From the sales point of view, the movie can be made to speed up the selling process. Through the use of photo-diagrams, animated drawings, and cutaway views which get inside the product, it becomes comparatively easy to point out and explain special features. An explanation which requires a series of photographs in the catalog or other forms of presentation can be covered in a matter of seconds with the movie. It unfolds the story, in whole and in part, dramatically, clearly, and concisely, leaving but few questions to be answered by the sales engineer. What better convincing argument is needed than to show your product in actual use, or to show it under actual construction? It leaves little room for doubt in your prospects' minds.

Again the movie will help new sales engineers learn more quickly by shortening the technical training period and will teach the seasoned sales engineer many new tricks. Whether your product is large or small, it can be carried on a film with the ease of carrying a briefcase. It is valuable as a creator of good will for your company and the industry as a whole. It should not be underestimated. Showing it to new employees will take the mystery out of your products, and do not forget it is a valuable weapon for building up employee morale.

The big disadvantage to the movie, as many of you know, is the cost, but this cost depends upon many elements, such as color, sound or silent, actors, dialogue, lighting sets, special effects, etc. Like any other sales tool, its success is dependent upon well-planned production and

use. The industrial movie is not like a Hollywood production, where you can sometimes take a poor plot and by using several stars turn out a money-maker. The plot in the industrial movie is your product—your company. No actor or combination of actors can turn it into a better product, and no plush selling can make up technical or engineering deficiencies. The industrial movie is not a miracle tool; it is not a cure-all for lagging sales, but to the mechanical-minded industrialist movies are very exciting.

As you may surmise, they are intriguing to me not just because a competitor is pouring large appropriations into them, but because I have seen them in action and know the attention they draw.

Television:—I do not know too much about television, but on the surface it seems to have promise as another great sales tool, in that it combines the best features of radio and the motion pictures. We can visualize amazing possibilities in its use and also potent difficulties. People are television conscious and it is a medium that should be given careful consideration.

As a comparatively new selling tool, the movie as well as the slide film, fits in nicely with the changing industrial scene and new selling methods. This is the age of change; the world we knew before the war is gone. We are now adjusting ourselves to supersonic planes and television. The world is changing so fast that you scarcely have time to digest what is new today before tomorrow is upon you with still further advances in our ways of doing things. But changes symbolize progress and American Industry has always been progressive. It is quick to anticipate what tomorrow will bring, and it is just as quick to act. These changes require vision and courage. Basically, they require sales promotion. We, as sales promotion men, cannot continue to use the techniques of by-gone years without trying to improve them. To be old-fashioned in business is to be out of business in a very short space of time. We must discard the rusty tools of selling and replace them with the new sharp ones which alone can do the job that lies before us.

We cannot relax and keep up with an America that is on the move. Production is showing the way; it is not enough for us to follow; we must keep pace with it and pass it, if we are to keep rolling. Every marketing technique, every advertising and sales tool we know, must be used wisely, courageously and extensively.

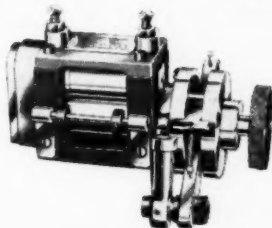
That's my job and it is your job too. The time to relax is at home or on a vacation. Every sales engineer is really in business for himself.

Humility has its place in selling. If you do not know the answer, admit it, but always offer to get that answer and be sure you do.

A cardinal principle in successful selling is in a sales engineer's attitude toward his customer. Instead of figuring out how to sell him, the sales engineer should always have in mind why the customer should buy. Supply the right answers to that and the customer will close the sale for you.

Dramatize the headline selling points. Do not attempt to tell all you know about your product. Rather, select from your sales kit that information which is applicable to your prospect's problem. Let your product talk. End of Lecture No. 13. **Marking Dies.** Described are mold inserts, roll dies, steel hobs, punch press and insert stamps. Built to individual specifications, incorporated intricate details of the most exacting trademark or design. 4 pages, photos. **The Metal Marker Mfg. Co., 1384 E. 40th St., Dept. BB, Cleveland, Oh.**

## *A Most Versatile* **ROLL FEED for \$99.50**



Suitable for 4-8 Ton Presses  
Shipped Complete from Stock  
... ready for mounting.

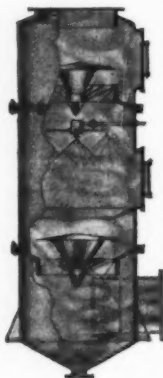
*Write for illustrated Circular*

**ROLL-FEEDS CORP.**

148 Middle St.

Pawtucket, R. I.

## DUST CONTROL DUCON WASHERS — DUCON CYCLONES



### CENTRIFUGAL AIR & GAS WASHERS. DUST COLLECTORS.

Wet suppression of dust is the best method. Collecting efficiency up to 99% and better. No secondary dust problem. No moving parts. No maintenance. Retains constant air capacity. Eliminates fire and explosion hazards. Can be used on high temperatures. Capacity from 500 cfm to 30,000 cfm per unit.



### HIGH EFFICIENCY CYCLONE DUST COLLECTORS

It pays to buy a Cyclone Collector engineered and manufactured by specialists. The only Cyclone Collector with controllable collection efficiency. Helical top eliminates all eddy currents. Heavy gauge steel welded construction.

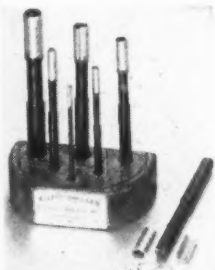


## THE DUCON CO.

147 East Second St., Mineola, L. I., N. Y.

DUST CONTROL

## SELF EXPANDING, LAP



- New!
- Faster!
- Longer Tool Life!
- Accurate Lapping!

Sold as illustrated in sets of six in sizes:  $\frac{1}{8}$ "  $\frac{1}{4}$ "  $\frac{3}{8}$ "  $\frac{1}{2}$ "  $\frac{3}{4}$ " and  $1\frac{1}{2}$ " in lots of 12.

A new lap with outstanding features. Sleeves are self-aligning when inserted in hole for lapping . . . thus performing as if equipped with a universal joint. Wearing surfaces are full length of the sleeves. Self expanding lap also used for multiple lapping. Write today for full details.

**CHICAGO BROACH CO., Inc.**

5514 W. Lake St.

Chicago 44, Ill.

## SNOW OPENS CLEVELAND OFFICE

Snow Manufacturing Company, Bellwood, Illinois, a western suburb of Chicago, opened a direct factory branch office at 720 Euclid Avenue, Cleveland, Ohio, on February 1st, according to Robert Cowan, vice president and sales manager. The new office will handle all sales and service in the Cleveland and northern Ohio area, on the Snow line of universal drilling, tapping and threading machines. Branch Manager is M. O. Kamprath.

Warren W. Matlack has been named industrial manager of the New York City branch of Brown Instruments division of Minneapolis - Honeywell Regulator Co; **Devon W. Fryback** has been appointed industrial manager of the Albany, N. Y. office, succeeding Matlack; **D. Lyle Russell** has been made industrial manager of the Hartford, Conn. office, succeeding Fryback; **Herman Hoyer** has been named industrial manager of the East Orange, N. J. district office.



# News of the ..... industry.....

## FOR MORE STEEL—HEAVY SCRAP IS A MUST

The United States Department of Commerce in cooperation with other Federal Agencies is appealing to American Industry through the Scrap Drive Committee in salvaging one million extra tons of industrial iron and steel heavy scrap. This drive is being sponsored to help increase the production of steel and castings for which heavy scrap, now in short supply, is a chief raw material. It has been revealed that even at the 1948 high annual rate of steel ingot production — 88½ million net tons — there was not enough steel to meet the demands of our domestic economy, military requirements, and the foreign aid program.

Steel and iron facilities are being expanded to help meet these requirements. On January 1, 1949, raw steel capacity, according to the American Iron and Steel Institute, was 1,187,000 tons higher than on January 1, 1948, and blast furnace capacity was 3,102,000 tons higher. Present schedules call for the addition during 1949 of 2,183,000 tons of steel-making capacity and 1,132,000 tons of blast furnace capacity. Therefore, if sufficient heavy scrap is made available, an estimated 92 million net tons can be produced this year, according to the American Iron and Steel Institute.

The 1949 Heavy Scrap Drive will concentrate on obtaining heavy scrap from industries, farms, and auto wreck-

ing yards. Householders will not be asked to participate, since private homes yield chiefly light scrap. Heavy scrap will produce more steel and castings than light scrap. By using heavy scrap, the efficiency of steel mill operations is increased in two ways: (1) for each melt, the charging time is shorter, because three times as much heavy scrap can be placed in the charging boxes used to load steel furnaces; (2) the percentage of scrap converted to steel is greater because there is less surface area, and therefore less loss in the melting operation.

In 1948, scrap constituted more than half of every article made of iron and steel; the average was 53.3% scrap, and 46.7% pig iron. Each year since 1940, the amount of scrap has exceeded that of pig iron.

### Facts on the Scrap Situation

While the over-all supply of scrap has improved somewhat, too much of it is light scrap, which is not in short supply. There is a shortage of heavy scrap for the following reasons:

1. Very little of the 123 million tons of steel and steel products exported during the war has returned as scrap.
2. With replacements scarce and expensive, much old equipment which would normally have been junked is still in use.
3. A virtual halt has been called on the junking of old ships and military



**SAVE TIME  
on Finishing Jobs!**

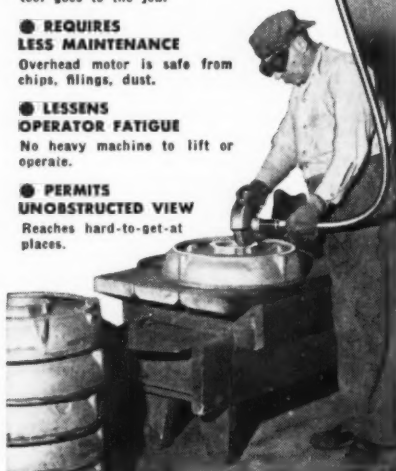
## STOW FLEXIBLE SHAFT MACHINE

- WIRE BRUSHES
- POLISHES
- GRINDS
- SANDS
- DRILLS
- FILES
- BUFFS

Models V40 & V50  
½-¾ or 1 HP

### • SAVE JOB TIME ... CUT COSTS!

- **PORTABLE**  
tool goes to the job.
- **REQUIRES LESS MAINTENANCE**  
Overhead motor is safe from chips, filings, dust.
- **LESSENS OPERATOR FATIGUE**  
No heavy machine to lift or operate.
- **PERMITS UNOBSTRUCTED VIEW**  
Reaches hard-to-get-at places.



Ideal for shops with limited room ... occupies no floor space.

**WRITE TODAY FOR FULL INFORMATION**

**STOW MANUFACTURING CO.**  
30 Shear St. Binghamton, N.Y.

equipment which have until very recently been a source of scrap.

4. The amount of heavy scrap produced in fabrication is not enough to meet the demand for new steel and castings.

5. Although some of the huge quantities of heavy scrap which is available in Germany and Japan is coming through, not enough can be expected until preparation and transportation facilities within these countries improve.

### How Industrial Plants Can Help

By appointing one top official as Salvage Director with full responsibility to investigate heavy scrap possibilities, and with full authority to sell any unneeded iron and steel items all plants in the country can be of assistance. Besides helping to produce more steel which will result in more equipment, industry can benefit by disposing of its heavy obsolete equipment. In so doing, it will obtain the use of valuable needed floor space, and will be able to cut down inventory costs on unused equipment.

Heavy scrap can best be supplied to the steel mills and foundries which need it through the normal channels of the trade—the local scrap dealers who are equipped to prepare and ship it promptly to customers.

### WESTERN METAL CONGRESS TO MEET IN LOS ANGELES IN APRIL

The Western Metal Congress and Exposition, staged by approximately 20 cooperating technical societies and applying to the oil, chemical, manufacturing, aviation, mining and other western industries, will meet for the sixth time on April 11-15 in the Shrine Convention Hall, Los Angeles.

The newest developments in producing, fabricating and applying ferrous and non-ferrous metals, will be described at the technical sessions in papers delivered by authoritative speakers.

Both "live" and non-operating displays will demonstrate what is new or improved in metals, metal working equipment and processes. Ferrous and non-ferrous metals, welding supplies

and equipment, heat treating equipment and service, foundry supplies, inspection aids, materials handling, metal cutting, machining equipment and tools will be exhibited.

# KINGSBURY OF HAMMOND CELEBRATES 50 YEARS WITH FIRM

Henry J. Kingsbury, chief engineer of Hammond Machinery Builders, Inc., Kalamazoo, Michigan, is in the enviable position of holding down a job and still being able to do as he pleases. This is being made possible as he enters partial retirement after fifty years of service with the company.



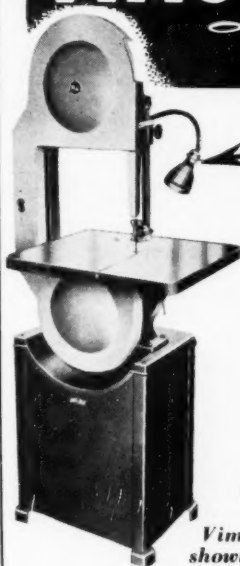
He has, in his half century of service, had much to do with placing his company's products in the forefront of the polishing, buffing and deburring fields through what has developed into a wide line of grinders, lathes and automatics, employing both wheels and abrasive belts.

Mr. Kingsbury's fellow-workers and friends pay him the tribute of never having heard him utter an unkind word, nor of ever having had anyone question his word. He will continue in active service with the company in its engineering research and development—a position in which he can come and go as he pleases, and still continue in a field of work in which he finds his major enjoyment.

# Eliminate the Shadow Menace INCREASE MACHINE ACCURACY

WITH

# VIMCO *Light*



**KEEPS COSTS  
DOWN!**

**REDUCES  
OPERATOR  
FATIGUE!**

**EASY TO  
INSTALL!**

**INEXPENSIVE!**

*Vimcolight at left  
shown on Heston and  
Anderson Band Saw*

Get hi-intensity lighting where you need it most. Socket with ball swivel joint gives precise control of light angle. Flexible arm adjusts easily . . . holds steady . . . can be furnished specially oil-proofed for wet operations. Variety of base fittings . . . easy to install. Many standard styles. Special engineered machine lighting upon request.



**WRITE FOR FOLDER NO. 74**

*Distributorships Available*

**VIMCO MFG. COMPANY, Inc.**  
**109 Brayton St. Buffalo 13, N. Y.**

## FULMER COMPANY PLANE EARNS ITS KEEP

The C. Allen Fulmer Company, Cincinnati manufacturers of cylinder honing machines and piston ring lappers, purchased in 1948 a four place Beechcraft airplane; the results of their experience with a company-owned airplane should be of interest to everyone in the machine tool industry.

Manufacturing plants are being de-centralized and located in many of the smaller towns, with others in or near the larger cities. It is seldom these small towns are served by commercial airlines, and in many cases, some of the larger cities have no direct service. However, they do usually have a small private airport nearby. Thus the smaller, company-owned, private plane can reach these plants quickly, when often the only way is to reach them by automobile or infrequent trains.

When a Fulmer representative is making a technical or sales trip, he often has only two or three calls to make in any one town, with his next scheduled stop often two or three hundred miles away. In traveling by other methods of transportation, this meant layovers, spending a large part of the time he was away from his plant just in reaching the people whom he wished to see. Such time is non-productive and expensive, but it is minimized by the use of a private airplane. In the air, he covers distance at the rate of 170 miles per hour, and in addition he will arrive at his destination rested and clean after a comfortable trip.

Honing is a type of finishing that is not so widely known and understood, as is also the case with certain other kinds of machining operations. As a result, many prospects for honing equipment like to see for themselves just how the machines will fit into their



program. It is a simple matter to fly a prospect to a plant, sometimes several hundred miles away, let him see the equipment in operation, and determine for himself just how it will help his problem, then have him back at his own plant, all in an afternoon.

Service must not be overlooked, since one of the most important factors in building up good will for a manufacturer is his customer service. Whenever a prospect has a finishing problem that may involve honing, a Fulmer engineer can be on his way immediately, at 170 miles per hour, get in contact with the proper men, discuss their problems in detail, offer suggestions for production, the tooling required and the type of equipment best suited for the customer's needs. All this is accomplished in a few hours, and at a time when the customer is in the midst of his problem. Such service is of real value to the customer and often saves him both time and money. Both prospects and customers appreciate such "in the plant" cooperation and service.

Perhaps you will say "All that is fine, but it is too expensive for us". It is not too expensive if it gives the customer a better understanding of the

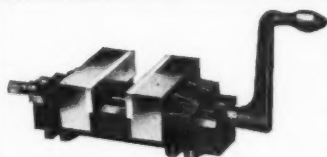
equipment he considers using and what it will do for him. The expense question is the most surprising part of the story on company plane transportation. The airplane used by C. Allen Fulmer Co., is a Beechcraft Bonanza, which carries four passengers and their baggage in comfort at a cruising speed of 170 miles per hour. The cost figures cited are, of course, for this plane, and would vary for other makes of airplanes.

Gas and oil for the Fulmer airplane varies from 2 to 2½ cents per mile at cruising speed. In addition, maintenance has been less than ½-cent per mile. Storage, insurance and depreciation are fixed at a definite sum per year, and thus the mileage flown per year controls the cost per mile of those items. On the basis of 50,000 miles per year (approximately 300 hours), this would be another four cents, roughly, making a total of less than seven cents per air mile. When this is broken down to passenger miles, the cost per passenger is less than two cents per mile.

One recent sales trip included calls in Missouri, Oklahoma, Texas, Louisiana and Alabama. The entire trip was

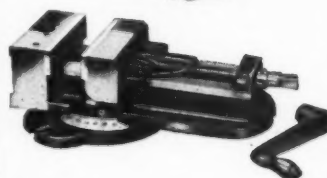
made in a week with a gasoline, oil and storage bill totalling \$47.50. For another example, the Fulmer Company has sub-contractors with whom it maintains close contact. One of them is in Birmingham, Alabama. A representative often leaves Cincinnati, after cleaning up the work in the office, flies to Birmingham for lunch and spends the afternoon in the sub-contractor's plant, and is back in Cincinnati for dinner. The cost, \$17.00.

The C. Allen Fulmer Co., by the use of their own airplane, can give much better service to both customers and those who are prospective customers. In addition, much valuable time is saved by executives and sales personnel. The Fulmer organization has found that an airplane can pay for itself in reduced transportation cost for executive and service men, and give the customer, or potential customer, much closer cooperation than he would otherwise obtain. They have found that the company airplane will pay.



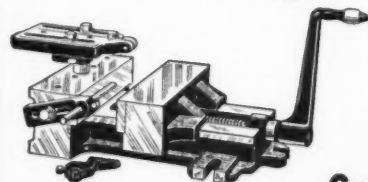
#### NEW GRAHAM CENTERING VISE

With left and right hand screw, both jaws move toward center, centering work regardless of size variations. This gives double-fast action. Can be used with interchangeable V jaws. Handle fits either end.



#### MULTI-PURPOSE SWIVEL BASE VISE

Has exclusive ADJUSTABLE ZERO POINTER to assure coincidence with zero on base. Complete 360° rotation. Positive 2-point lock in any position. Screw never protrudes under work, cannot be drilled into. Usable with special jaws and jig attachments described below. Removable from base for use plain.



#### JIG ATTACHMENT VISE

Usable plain. Also drilled and tapped for stops, guides, bushing plates and other attachments making it a Multi-purpose jig or fixture serving many repeat-operation needs saving the cost of making special devices.

#### ALSO "ADJUSTANGLE"-KNURL TOOL FITTING TURRET

Request Illustrated Price Bulletin 44

**Graham Mfg. Co.** 56 Bridge St.  
East Greenwich, R. I.

## BRITISH INDUSTRIES FAIR WILL ATTRACT MANY U. S. BUYERS

Thousands of American buyers and representatives of American firms in London will shortly receive invitations to attend the British Industries Fair, the world's greatest industrial "shop window", to be held from May 2 to 13, at Earl's Court and Olympia, London, and at Castle Bromwich, Birmingham, England.

Hundreds of American buyers attended last year's show, and the number is expected to be exceeded this year. In all, 15,000 traders and manufacturers, from 130 countries visited the B.I.F. in 1948.

Typical of the inquiries made to the British Information Services by prospective visitors is the question of securing hotel accommodation.

If rooms are reserved at once through the ordinary booking agencies, no difficulty will be experienced. Since the end of World War II, hotels in Britain have had time to renovate and re-equip

their facilities for tourists, but rooms at the best hotels near the Fair buildings, or in London's West End are, naturally, soon booked up.

In Birmingham, officers on the staff of the Fair have records of the accommodation available, with the charges, nearest transport, and so on. Normal booking facilities in the visitor's own town, should be adequate, but in an emergency the United Kingdom Government's consular officers or trade commissioners will do their best to help.

The problem of getting sufficient gasoline for visitors' cars can be solved by asking through local auto clubs to arrange with one of the United Kingdom's associations for the issuance, upon disembarking, of an international circulation permit and an allowance of gas rationing coupons. If visitors need to use their cars for business purposes during their stay, application may be made through the reception branch of

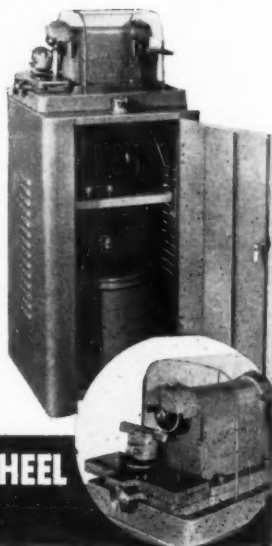
## CARBIDE TOOL GRINDER

### FEATURES:

- Grinds Chip Breakers
- 9000 RPM spindle uses smaller Diamond wheels.
- Equipped for wet grinding.
- Single End Model also available.
- Shipped complete with Diamond wheels.

Let us show you how your production can be increased at no cost to you.

Write for Bulletin showing Grinder and complete line of Diamond wheels.



**UNITED STATES DIAMOND WHEEL**  
**AURORA CO. ILLINOIS**

the Board of Trade for supplementary coupons.

Facilities for correspondence will be furnished by the Overseas Buyers' Clubs. Shorthand-typists will take letters and have them translated. Full telegraphic and international telephone services are provided. Correspondence can be personally addressed to visitors at the club or "c/o G.P.O." (Care of the General Post Office). And the clubs are pleasant places to relax in. Meals can be taken in restaurants without any rationing formalities. For visitors staying in hotels, temporary ration cards will be issued where necessary. The inquiry offices in the Overseas Buyers' Clubs will explain the simple procedure of getting these cards.

Opportunities for transaction of on-the-spot business are encouraged by the Export Promotion Department of Britain's Board of Trade, who organized the Fair; they are most anxious that everything shall be done to facilitate this.

There will be special inquiry bureaux both in the London and Birmingham sections, staffed by officials able to give out any information needed about regulations affecting international trade, import duties and restrictions, invoicing requirements and certificates of origin. Officers of Britain's Export Credit Guarantee Department will be available to advise on facilities for financing exports from Britain.

There are two catalogs for both sections of the Fair—an advance and a final edition. Nine thousand copies of the advance catalog are now being sent out in time to reach every overseas buyer who tells the United Kingdom consular authorities he intends to visit the Fair. He is given a copy of the final edition when he arrives at the Fair. This has a loose index, together with a badge that admits the visitor without charge to all sections of the Fair, and to the clubs.



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Available all sizes 3/16 to 3/4 inches... also  
midget laps for sizes under 3/16 inch.

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— R. C. Eisenmann



**Flex-O-Lap's** strong, spring tension qualities adjust quickly and accurately to any size.

Off-center slots permit a strong lapping pressure without danger of seizing.

Sensitive flexible expansion up to 15% or more.

Easier to lap holes straight and round with Flex-O-Lap, adjustment screw assures utmost precision.

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# **INDEX OF NEW ORDERS AND SHIPMENTS OF MACHINE TOOLS**

Base—Average Shipments 1945-1946-1947=100 %

| Date        | New Orders<br>(Total) | Foreign Orders<br>(Included in<br>Total) | Shipments<br>(Total) | Ratio<br>Unfilled Orders<br>to Shipments |
|-------------|-----------------------|--|----------------------|--|
| <b>1947</b> |                       |  |                      |  |
| Apr.        | 69.8                  | 18.8                                     | 93.3                 | 5.3-1                                    |
| May         | 76.9                  | 16.3                                     | 89.2                 | 5.2-1                                    |
| June        | 90.9                  | 17.2                                     | 84.1                 | 5.5-1                                    |
| July        | 81.1                  | 16.7                                     | 65.2                 | 7.4-1                                    |
| Aug.        | 62.1                  | 14.6                                     | 63.6                 | 7.5-1                                    |
| Sept.       | 63.7                  | 14.7                                     | 77.0                 | 5.9-1                                    |
| Oct.        | 81.0                  | 16.0                                     | 94.8                 | 4.6-1                                    |
| Nov.        | 75.6                  | 11.5                                     | 84.7                 | 5.1-1                                    |
| Dec.        | 81.1                  | 14.8                                     | 98.4                 | 4.1-1                                    |
| <b>1948</b> |                       |  |                      |  |
| Jan.        | 83.1                  | 14.0                                     | 75.3                 | 5.4-1                                    |
| Feb.        | 77.3                  | 12.7                                     | 87.1                 | 4.7-1                                    |
| Mar.        | 86.3                  | 16.1                                     | 83.6                 | 4.6-1                                    |
| Apr.        | 86.3                  | 14.1                                     | 82.0                 | 4.7-1                                    |
| May         | 73.5                  | 11.4                                     | 82.6                 | 4.5-1                                    |
| June        | 83.4                  | 11.9                                     | 94.4                 | 3.8-1                                    |
| July        | 74.0                  | 13.3                                     | 62.4                 | 5.9-1                                    |
| Aug.        | 73.7                  | 13.6                                     | 69.8                 | 5.2-1                                    |
| Sept.       | 73.1                  | 11.6                                     | 84.7                 | 4.3-1                                    |
| Oct.        | 67.4                  | 14.0                                     | 80.4                 | 4.2-1                                    |
| Nov.        | 72.2                  | 18.1                                     | 76.2                 | 4.4-1                                    |
| Dec.        | 76.7                  | 16.2                                     | 96.9                 | 3.2-1                                    |



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**Heavy Service C-CLAMPS General Service**

| No. | Cap. Inches | Make                         | Reg. Price  | Our Price  |
|-----|-------------|------------------------------|-------------|------------|
| 0   | ¾           | WILLIAMS VULCAN DROP FORGED  | \$ 1.03 ea. | \$ .70 ea. |
| 1½  | 1¾          | WILLIAMS VULCAN DROP FORGED  | 2.58 ea.    | 1.75 ea.   |
| 3   | 3¾          | WILLIAMS VULCAN DROP FORGED  | 5.15 ea.    | 3.50 ea.   |
| 8   | 8½          | WILLIAMS VULCAN DROP FORGED  | 14.42 ea.   | 9.30 ea.   |
| 10  | 10½         | WILLIAMS VULCAN DROP FORGED  | 19.75 ea.   | 13.30 ea.  |
| 112 | 12          | WILLIAMS AGRIPPA DROP FORGED | 8.76 ea.    | 5.95 ea.   |
| 115 | 15          | WILLIAMS AGRIPPA DROP FORGED | 11.33 ea.   | 7.70 ea.   |
| 118 | 18          | WILLIAMS AGRIPPA DROP FORGED | 14.42 ea.   | 9.80 ea.   |

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## ANNUAL A.S.T.E. MEETING SCHEDULED FOR MARCH 10-12

Members of the American Society of Tool Engineers will have L. E. Osborne, senior executive vice president, Westinghouse Electric Corporation, as the featured speaker at their national banquet Saturday evening, March 12, in the Hotel William Penn, Pittsburgh, according to an announcement by I. F. Holland, president of the Society. This banquet will climax the Society's Seventeenth Annual Meeting scheduled March 10, 11, 12 in Pittsburgh. The ASTE's three-day Annual Meeting will emphasize technical discussions, featuring talks on industrial methods, machines and operations by leaders in the various fields, as well as tours of many plants in the Pittsburgh area.

At 8:00 P.M., Thursday, March 10, "Design of Dies for Upsetting and Forging Machines", will be presented by William W. Criley, Vice President and General Manager of the Ajax Manufacturing Company, Cleveland.

"Modern Glass Development" will be discussed by Robert A. Miller, Technical Sales Engineer, Pittsburgh Plate Glass Company. Nelson A. Mason, Manager, Maintenance-Painter Sales, Pittsburgh Plate Glass Company, will talk on "Color as a Tool."

At 8:00 P.M., Friday, March 11, Dr. George A. Roberts, Chief Metallurgist, Vanadium Alloy Steel Company, Latrobe, Pa., will talk on "Forming of Corrosion-Resistant Steel" and Malcolm F. Judkins, Chief Engineer, Carbide Division, Firth-Sterling Steel and Carbide Corporation, McKeesport, Pa., will discuss "Machining of Corrosion-Resistant Steel".

Two concurrent sessions are scheduled at 10:00 A.M. Saturday, March 12. A discussion on "Basic Facts about Metallizing" will be delivered by Walter B. Meyer, Secy., American Metallizing Contractors Assn., and Manager, Metallizing Division, John Nooter Boiler Works Company, St. Louis.

Two representatives of the Aluminum Company of America will speak at the other Saturday session. E. G. Kort of the Jobbing Division, will dis-

cuss "Forming Aluminum" and E. F. Howarth, Chief of the Metal Working Division, will talk on "Machining Aluminum".

At the Saturday night banquet, new national officers and officers of the Pittsburgh chapter of the American Society of Tool Engineers will be installed.

Plant tours on March 10 and 11 will include visits to National Supply Company; Westinghouse Electric and Manufacturing Company, Nuttall Division; J. H. Matthews & Company; Aluminum Company of America; Carnegie-Illinois Steel Corporation, Irvin Works; Firth-Sterling Steel Company; Gulf Oil Company Research Laboratories; Westinghouse Air Brake Company, Industrial Division.

Arrangements have been made for a visit to the Buhl Planetarium at 2:00 P.M. on Saturday and the ladies attending the Annual Meeting will have an opportunity to visit the H. H. Heinz Company at 1:30 P.M. on Friday.

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### EUCLID UNIVERSAL MACHINE, INC.

Euclid Machine & Tool Company, partnership, has been dissolved and a new corporation formed, Euclid Universal Machine, Inc., for the manufacture of speed reducers and other products. The address, 15002 Woodworth Road, Cleveland 10, remains the same. Officers of the new company are Fred Sneller, president, and Clifford F. Sneller, executive secretary and treasurer. Clifford Sneller continues also to serve as chief engineer responsible for the design of the company's principal product, Euclid Universal Speed Reducers.

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C. J. Burnside, associated with Westinghouse radio and electronic activities for 24 years, has resigned and organized an independent industrial consultant service with headquarters in Baltimore. He will continue his association with Westinghouse as a consultant.

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**REPRESENTATIVES** CONTACTING ACCOUNTS who need the special services our experience offers

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**FASTCUT TOOL DIV. HILTON Mfg. Co. 2525 Hilton Road  
Ferndale Mich.**

### CLEVELAND SITE OF 1949 METAL CONGRESS

Cleveland will be host to the Metal Congress and Exposition in 1949 when the national event has its 31st annual meeting at the city's huge Public Auditorium on October 17-21.

W. H. Eisenman, national secretary of the American Society for Metals, and managing director of the Congress and Exposition, has announced that floor plans for the Cleveland show were in the hands of previous Exposition exhibitors February 1st, and that space assignments will be made March 12th.

"Details for handling a record breaking attendance of men in the metals producing and metals consuming industries have been worked out," said Eisenman, "and hundreds of important companies plan to demonstrate, not only their new products and services but also effective means of further contributing to lower production costs."

The "Metal Show", largest of its kind in the world, will require the entire space of both floors of the Public Auditorium as well as all of the area underground . . . 250,000 square feet.

The Housing Bureau, always important to the comfort of the thousands who attend the event, has already been set up and is functioning under the able direction of Mrs. Louise D. Perkins. The Housing Bureau's permanent address—511 Terminal Tower, Cleveland 13, Ohio.

### GEORGE W. EMRICK 1884-1949

George W. Emrick, prominent Brooklyn industrial executive, died suddenly in Palm Beach, Fla., on January 19, 1949. Mr. Emrick was chairman of the board of the Ettco Tool Company, 594 Johnson Avenue, Brooklyn, N. Y. He had been associated with the Ettco firm for thirty years, and had served as board chairman for the past two years, and as president for the preceding ten. Mr. Emrick was 64; he made his home at 150 Greenway Terrace, Forest Hills, N. Y. He was a member of the American Society of Tool Engineers and the North Hills Golf Club on Long Island. He is survived by his widow, and two sons, Melvin and Robert Emrick.




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HIGH TENSILE STRENGTH

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| 1/2 x 2" | ..... \$ .47 ea. |
| 1/2 x 3" | ..... .55 "      |
| 5/8 x 2" | ..... .54 "      |
| 5/8 x 3" | ..... .64 "      |
| 3/4 x 2" | ..... .70 "      |
| 3/4 x 3" | ..... .82 "      |
| 1 x 4"   | ..... 1.40 "     |

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For tapping & threading with spindle alignment on drill press, lathe, jig borer.

Good Threads, Longer Tap and Die Life, Time Saved, Money Saved!

Shipped On  
5 Day Approval  
Immediate Delivery

**LASSY TOOL CO.**  
Plainville, Conn.



#### CHARLES C. CARR, 1882-1949

Charles Cameron Carr, veteran ordnance manufacturing expert, died at his home in Cincinnati, Saturday, January 8, at the age of 66. Associated with the R. K. LeBlond Machine Tool Company for 44 years, he was recognized all over the world as one of the leading authorities on gun boring and rifling lathes.



His death, which came four years after a cerebral hemorrhage, climaxed a long period of poor health.

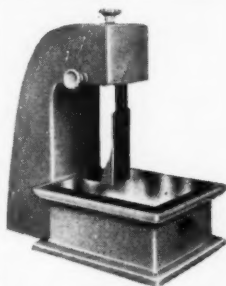
Mr. Carr started at LeBlond as a lathe operator in 1905, worked his way up to foreman in 1919, and later joined the sales department as field engineer. He represented his firm for over 25 years and traveled abroad in 1928 and 1937. His travels took him to Great Britain, continental Europe, and during his last trip he visited Nazi Germany.

Mr. Carr's broad experience and ability in ordnance manufacturing methods made him popular with U. S. Army and Navy officials during the last war. He specified equipment and estimated time required to produce Army howitzers from 75-mm to 8", and Navy rifles from 3" to 8". His work took him repeatedly to arsenals at Houston, Watertown and Watervliet, as well as to such ordnance manufacturers as Westinghouse, Chain Belt, Ridgewood Steel and others.

#### POTTER & JOHNSTON COMPANY CELEBRATES 50TH ANNIVERSARY

Potter & Johnston Company, Pawtucket, R. I., a wholly-owned subsidiary of Pratt & Whitney, Division Niles-Bement-Pond Company, West Hartford, Conn., recently celebrated the 50th anniversary of the founding of this well-known machinery firm. On December 28, 1948, the big doors of the plant were opened wide for employees' families who paid a visit to the plant. The celebration was organized under the leadership of Clayton R. Burt, president, and veteran machine tool builder, ably assisted by a staff of P & J employees who handled all the details.

Over 1200 P & J employees went through the big plant, which was in full operation. Refreshments were served and employees and their families were presented with copies of a new book "Fifty Years of Achievement" which contained the history of the company from its founding by a pair of Scots in 1898 to the present moment.



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The new bench-type Wet and Dry Belt Sander, Grinder, Burring and Polishing Machine. The ideal machine for increasing production in all factories.

This machine can be used on all wood, metals, plastics and die-castings, etc.

Belt Size—2" x 36"

Work Table—9" x 10"

H. P. Required— $\frac{1}{4}$  to  $\frac{1}{2}$

Price— \$69.50 F.O.B. Orange, Mass.

Write for descriptive literature.

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204 Mechanic Street  
Orange, Massachusetts

### ENGINEERING GRADUATES TO FIND

Competition among college graduates for positions in engineering will be keener during the next few years. However, the field of electrical utility engineering offers a brighter occupational outlook than other phases of engineering. These conclusions were contained in a study prepared for the Veterans Administration by the Occupational Outlook Service, Bureau of Labor Statistics, U. S. Department of Labor.

Engineering graduates generally will find "stiffer competition" for jobs, the study said. Over 35,000 engineers are expected to graduate in 1949, and close to 50,000 in 1950.

"This tremendous volume of young engineers is many times the 7,000 or

### GROWING COMPETITION

so needed to replace older engineers, dropping out of the profession annually," the report stated. "Although the engineering profession has been expanding rapidly over the past several decades and will probably continue to grow, the rate of growth is slowing down."

The report added that the development of atomic energy power plants to produce electricity "is not expected to have much influence on the industry during the next 10 to 20 years. Even when such plants come into regular operation they are not expected to have much effect on employment in the industry, since they involve primarily a substitution of atomic fuel for coal and other fuels."



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**PUNCH  
PRESSES**

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DETAILS**

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**HORN PRESS**

**DEEP THROAT**

**SERVICE MACHINE COMPANY · CHICAGO 20,**

## U. S. STEEL EXECUTIVE DISCUSSES THREAT OF NATIONALIZATION

"Since the President's recent state of the union message, much has been said about a possible threat contained therein of the government entering the steel business," Irving S. Olds, chairman of the board of directors, United States Steel Corporation, said in an address at a dinner of the Manufacturers' Association of Hartford County (Conn.) at the Hartford club on Jan. 20.

"While that may seem . . . a remote possibility, I should not be surprised to learn that the eventual nationalization of the steel industry along proposed British lines is in the minds of some of our critics," he declared. "Industry should be alert to the possible firing of an opening gun in a long range program for the entry by government into what has heretofore been regarded as private business.

"We are told that the steel industry refused to expand its facilities; that the steel industry is holding down production so as to maintain present high

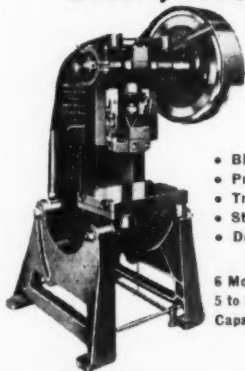
prices. What are the facts?

"Steel prices are among the least inflated of all present prices. Anyone who takes the time to look at current newspapers can read that the steel industry, week after week, has been operating at almost 100% of its steel-making capacity. In 1948 the industry shipped 65,000,000 tons of finished steel products . . . a record high production for any year, wartime or peacetime, in the history of the American steel industry.

"That production performance, in all fairness, entitles the members of the steel industry to high credit for a job well done, and not to criticism or abuse.

"Since V-J Day, a period of little more than three years, the various members of the steel industry have voluntarily embarked on construction programs to increase and improve their steel-producing and finishing facilities, which add up to a total cost in excess of \$2,000,000,000.

## Cut Production Costs with . . .



## PRESS-RITE PUNCH PRESS

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6 Models  
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Time and cost cutting features of PRESS-RITE open back inclinable presses include: Greater shut height for faster set ups . . . built in safety mechanism for operator efficiency . . . triple ram-way lubrication . . . reinforced frame and many others.

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- Anti-friction roller bearings in flywheels

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5208



Riehle Testing Machines Division of American Machine and Metals, Inc., East Moline, Ill., has announced the appointment of **Howard E. Pellett** as sales engineer covering California, Nevada and Arizona.

Benjamin F. Fairless, president of United States Steel Corporation of Delaware has announced the appointment of **M. W. Reed** as engineering vice-president to succeed **B. H. Lawrence**, who is retiring after over 44 years of service with U. S. Steel.

**Alden K. McCollum** has been named manager of the General Electric Company's laminated plastics plant at Coshocton, Ohio, according to a recent announcement by **Robert O. Bullard**, manufacturing manager of the Plastics Division of the G-E Chemical Department.

**Otto A. Pfaff**, president of American Wheelabrator & Equipment Corp., Misawaka, Ind., has recently been elected to the board of directors of Signode Steel Strapping Co., Chicago.

**R. L. deBrauwere** was elected assistant vice president of the Scovill Manufacturing Co., Waterbury, Conn. He continues as assistant secretary of the Scoville Manufacturing Co., and as secretary and director of A. Schrader's Son, Inc., Brooklyn, N. Y.

**C. A. Scharschu**, director of research of Allegheny Ludlum Steel Corp., Pittsburgh, has been appointed assistant technical director, it has been announced by **F. B. Lounsberry**, the company's technical director; **Dr. L. C. Hicks**, associate director of research, will fill Scharschu's former position.



**B. L. Wise**, director of production, National Electric Welding Machines Co., Bay City, Mich., has been elected president of the Resistance Welder Manufacturers' Association, succeeding **T. S. Long**, vice president and general



**B. L. Wise**



**T. S. Long**



manager of Taylor - Winfield Corp., Warren, Ohio who was elected chairman of the executive committee. Named vice-president of the group was **T. Embury Jones**, president of Precision

Welder and Machine Co., Cincinnati. The "alloy" group in the association elected as its chairman, **W. G. Fetter**, manager, Resistance Welding Division, P. R. Mallory & Co., Inc., Indianapolis. **George A. Fernley** and **H. R. Rinehart** were re-elected executive secretary and secretary-treasurer, respectively.



**T. Embury Jones**



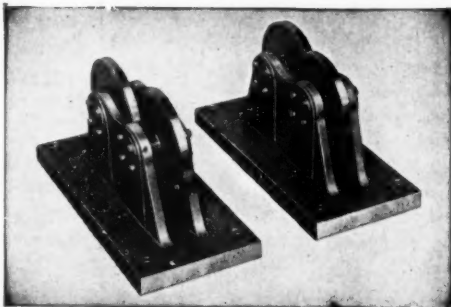
**John R. Bartizal**



**John R. Bartizal** has become executive vice president of Clearing Machine Corporation, Chicago manufacturers of metal forming presses.

## PILLOW BLOCK BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work. Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



**Built in 1000, 2000, 5000, 10,000 and 20,000 Capacities**

Write for Bulletin 2-5



**ANDERSON BROS. MFG. CO., Rockford, Ill.**  
Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.



## New Ettco-Emrick

ELECTRIC-AIR CONTROLLED  
TAPPING MACHINE  
GIVES RESULTS!

PART: Zinc die casting  
OPERATION: Tap  $\frac{5}{16}$ -16  
hole in each casting.  
PRODUCTION: 2400 parts  
per hour PLUS.

Speed and versatility are two big features of the Ettco-Emrick Tapping Machine.

It operates with either single or multiple spindle heads. Changing work holder units and heads from job to job is a matter of minutes.

As for speed, the results on the job above speak for themselves. Electric-air control is the answer. It provides full or semi-automatic operation—regulates depth of stroke—operates work-holding fixture—ejects finished parts.

### WRITE FOR DETAILS

and send sample part or drawing for quotation on production figures and complete tooling cost.

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596 JOHNSON AVE., BROOKLYN 6, N. Y.

Boston, Mass. • Portland, Conn.  
Detroit, Mich. • Chicago, Ill.

DRILL & TAP CHUCKS • TAPPING ATTACHMENTS  
MULTIPLE DRILLING & TAPPING HEADS  
DRILLING & TAPPING MACHINES



Myron Zuker, Detroit, has been named representative in Southeast Michigan and Toledo for Precision Welder and Machine Company, Cincinnati.

Gits Brothers Manufacturing Co., Chicago, has appointed Frank A. Kovarik as general sales manager to establish and manage the new Michigan branch office, in Ludington, Michigan.

The appointment of V. B. Baker as manager of the General Mill Section of the Industry Engineering Department, Westinghouse Electric Corporation, East Pittsburgh Works, was announced by A. A. Monteith, vice president in charge of engineering.

Clifford F. Hood, president of American Steel and Wire Co., United States Steel subsidiary, announces the appointment of William I. Ong as assistant to the president; Lewis E. Zender has succeeded Ong as director of the firm's and the Ohio-Michigan district public relations activities; Alvin L. Kreig has been named Zender's assistant.

Leo F. Fowler has been made factory superintendent, George F. Brown appointed master mechanic, and Melvin S. Stern promoted to planning superintendent at Universal Products Company, Inc., Dearborn, Mich.

Stewart Kerr, Detroit attorney, has been appointed executive secretary of the National Association of Engineering Companies, according to an announcement made by Walter W. Schmitt, president of the organization.

Chain Belt Company of Milwaukee announces the opening of two new District Sales Offices—one at St. Louis, under the direction of Clarence R. Studer, district sales engineer, and one at Jacksonville, Fla., under the direction of David B. Hill.

J. Arthur Deakin & Son, 182 Sigourney St., Brooklyn 31, N. Y. have been appointed by George H. Alexander Machinery, Ltd., of Birmingham, England, as their exclusive representatives in the New England and Middle Atlantic States.

## MIGHTY MIDGET RADIUS DRESSER

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Hardened Shaft Bearing Adjustable for Wear. Diamond Always Clamped Perfectly in Place. Order Direct on 10 Day Money Back Guarantee.

10" Wheel Size for DoAll or Norton—\$35.00, less Diamond

**SPERMAN METAL SPECIALTIES 2199 E. 21st ST., BROOKLYN 29, N. Y.**

Steel City Testing Machines, Inc., announce the appointment of two exclusive sales representatives: **J. W. Dice & Co.**, Grand View-on-Hudson, N. Y., has been appointed to cover the Middle Atlantic Area. **Steel City Tool & Machinery Co., Inc.**, Plaza Building, Pittsburgh, Pa., has the Pittsburgh area including Western Pa., W. Va., and adjacent counties in Ohio.

**Maj. Gen. (ret.) Walter A. DeLamater** has been elected a vice president of the Heli-Coil Corporation, Long Island City, N. Y.

**B. John Heiser** has been elected president of the Central Ohio Steel Products Company, Galion, Ohio.

The board of directors of the Thompson Grinder Co., Springfield, Ohio, announces the election of **John C. Wilson** to directorship and his appointment as vice president in charge of sales. He will also continue to supervise advertising.

**A. L. Hawley**, formerly assistant works manager, has recently been appointed works manager of the main factory, Los Angeles, of the Plomb Tool Company, according to C. W. Coslow, vice president in charge of manufacturing.



• • •

**A. L. Hawley**

• • •

**Frank H. Stohr** has been named general manager of the Allis-Chalmers Manufacturing Company's Norwood Works, according to an announcement by W. C. Johnson, executive vice president in charge of the firm's general machinery division.

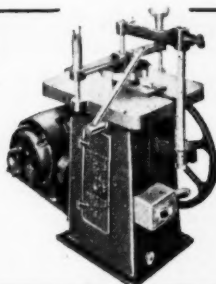
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### THE READING BROACH KEYSEATER

The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from  $\frac{1}{8}$  to  $\frac{3}{8}$  cutter.

Low first cost—prompt delivery.

**READING MACHINE COMPANY, Reading (Cincinnati), Ohio**



**STILL  
LOWEST PRICED  
"LIVE" CENTER**



**Revolving Tip Lathe Centers**

**New.**



No. 2 Morse **\$6.25**  
Taper Shanks

No. 3—\$7.75 No. 4—\$9.75

Ask Your Dealer for Details

- No BULKY HEADS
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- Precision Work due to Long Bearing Surface of Spindle.

**ERNEST H. VANDERWALL CO.**

440 Golden Gate Ave.

**SAN FRANCISCO 2, CALIF.**

Promotions in the Sales Division of Fairbanks, Morse & Co., Chicago, recently announced by Robert H. Morse, Jr., vice president in charge of all company operations: **O. O. Lewis** has been promoted to Sales Manager. **Harry L. Hilleary**, is promoted to assistant sales manager, at Chicago. **L. A. Weom**, is transferred to St. Louis as Branch House Manager, succeeding Hilleary. Donald T. Johnstone, succeeds Weom as manager of the firm's Pump Division in Chicago.

William J. Greene, vice president and director of sales for the L. S. Starrett Company, Athol, Mass., announces the following appointments: **Carlton S. Phillips** has been appointed Eastern Sales Manager; **Walter W. Haskins**, has been appointed Western Sales Manager; **Carl O. Newton** has been named New York Branch Manager to succeed Phillips. **Robert J. Norwalk** has succeed Haskins as Chicago Branch Manager.

Jannette Manufacturing Co., Chicago electric motor manufacturers, announce the appointment of the following representatives: **Edward W. Weiler**, as representative to the Eastern U. S. Government Bureau, with offices in New York and Washington; **G. R. Haley**, representative for the South Central territory, with offices in Dallas, Houston, and New Orleans; in San Francisco, **L. R. Burnester**, c/o Monarch Supply Co.; for the Buffalo territory, **Harry C. Glaser**.

The Black & Decker Mfg. Co., Towson, Md., announces that **James F. Moore** has joined the Chicago Sales Department as sales engineer. **T. J. Waters** has been appointed service engineer for Chicago. **W. E. Boyles** has been transferred to the Cleveland Branch as sales engineer and **R. B. McClellan** has been appointed service engineer in New Orleans to fill the vacancy created by Boyles' promotion; **Thomas Rogers** has been promoted to a sales engineer at the Dallas Branch.

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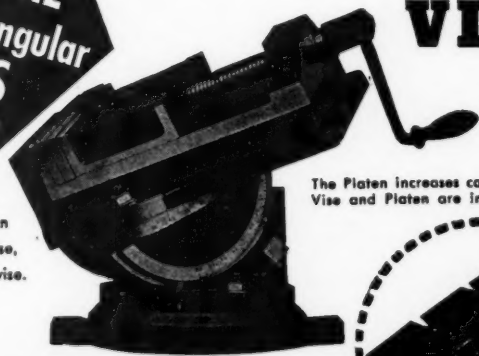
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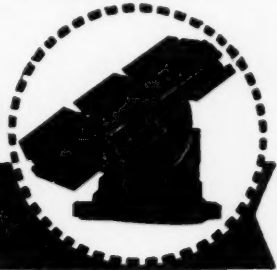
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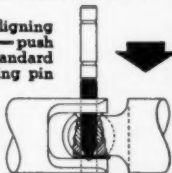
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Support joint rigidly with smallest pin in vertical position. Press out small pin. Be sure Lock Ring in center block recess is not lost.

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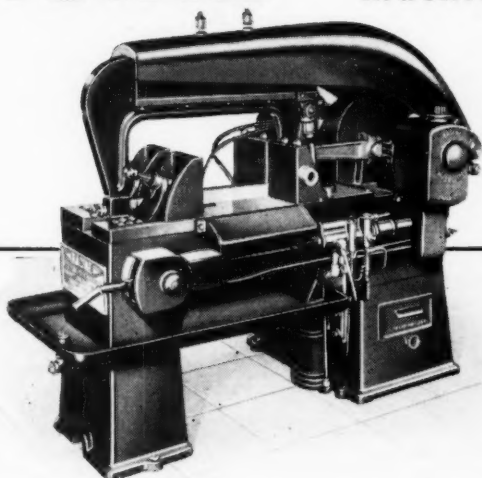
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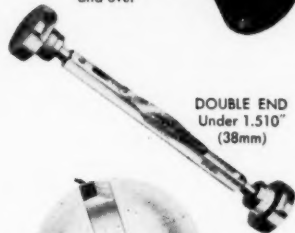
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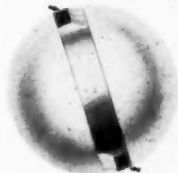
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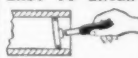
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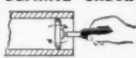
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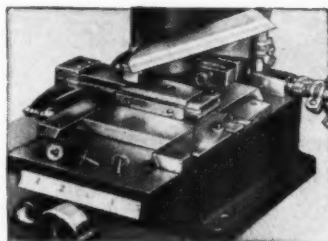
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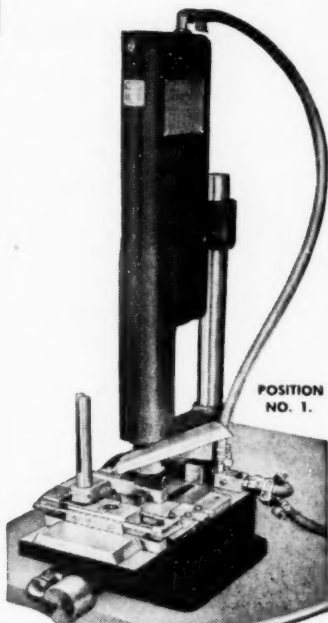
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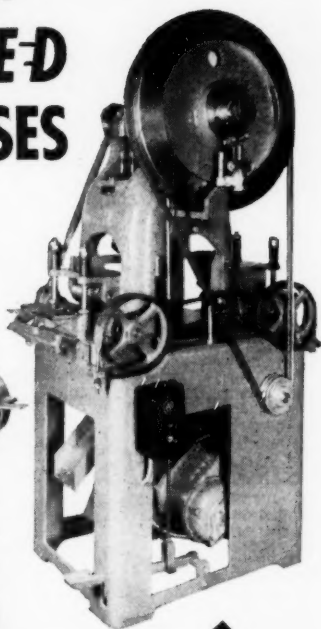
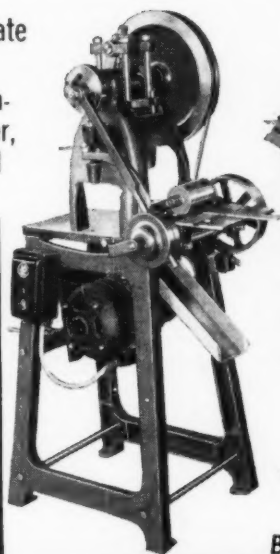
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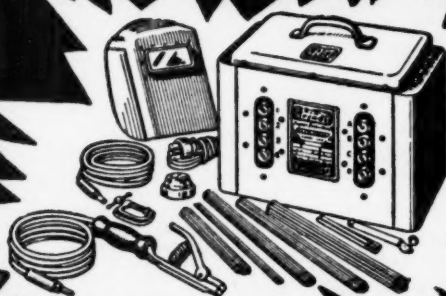
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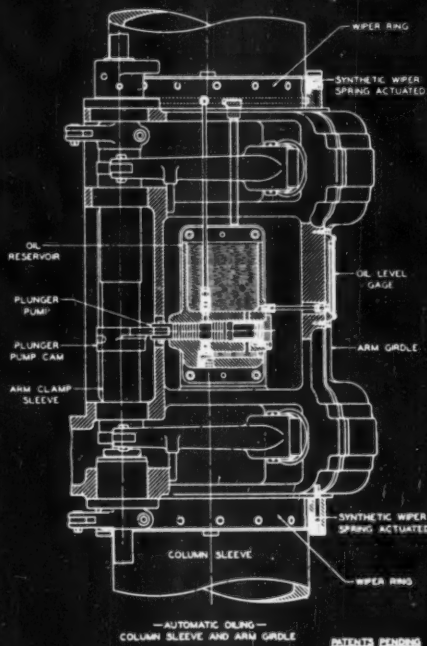
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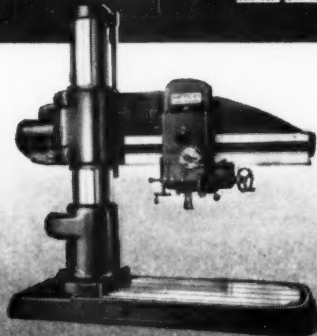
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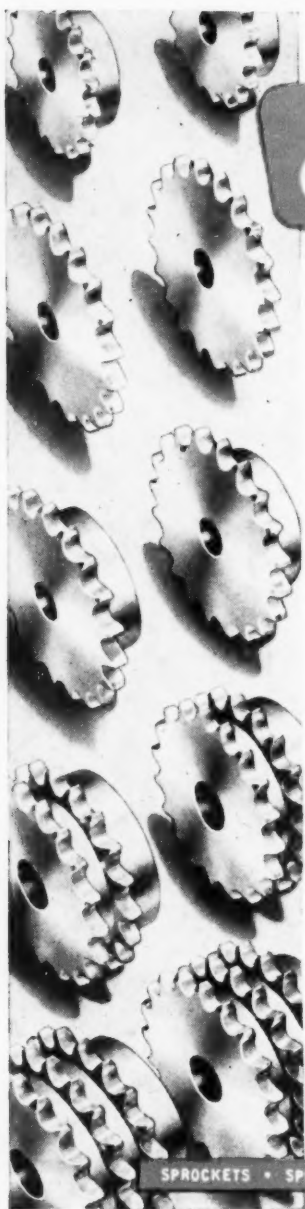
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